291

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Admiral	C2256, C2306BZ, Z, C2307BZ, Z, T1812B, T2212B, T2242BZ (Ch. 20XP5, A, 20X5A, CZ, EZ) Tel. Rec.	291-2
AMC	54CL021, 54CM21, 54TW21 Tel. Rec.	291-3
Browning	RV-32	291-4
David Bogen	J-330	291-5
Emerson	830B (Ch. 120252-B)	291-6
Emerson	1030D, 1032D, 1058D, 1060D, F, 1062D, F, H, 1064D, 1104D, 1106D, F (Ch. 120220-D, 120239-D, -F, 120251-D, 120254-D) Tel. Rec. Prod. Chg. Bul. 132	291-1
Espey	700	291-7
Magnavox	CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series) Tel. Rec.	291-8
Packard-Bell	17101, U, 17104, U, 21102, U, 21204, U, 21206, U, 21402, U (Ch. T-10) Tel. Rec. Prod. Chg. Bul. 132	291-1
Raytheon	C-2163, C-2166, M-2165, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, AS, 21T25AGH, AS, 21T27AGH, AS) Tel. Rec.	291-9
Revere	TR-1000, TR-1200, TRS-1005, TRS-1025, TRS-1026, TRS-1205, TRS-1225, TRS-1226, TS-905, TS-925, TS-926, TS-1105, TS-1125, TS-1126, TS-1405, TS-1425, TS-1426, T-900, T-1100, T-1400 Recorder	291-10
Wells-Gardner	321AM57-A-436-1, 321AM57-A-470-1, 321AS57-A-436-1, 321AS57-A-470-1, 2321AM57-A-438-1, 2321AM57-A-494-1, 2321AS57-A-438-1, 2321AS57-A-494-1 Tel. Rec., Prod. Chg. Bul. 132	291-1

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 275

Emerson models 1030D, 1032D, 1058D, 1060D, 1062D and 1064D were covered in Photofact Folder 7 — Set 275.

Several new models and chassis along with the latest production changes are added with the publication of this bulletin.

A complete list of all models, chassis, picture tube and tuner used in each is given below:

MODEL	CHASSIS	PICTURE TUBE	TUNER
1030D	120220-D	14HP4	470755/470771
1032D	120220-D	14HP4	470755/470771
1058D	120239-D	17LP4	470775
1060D	120239-D	17LP4	470775
1060F	120239-F	17LP4	470785
1062D	120239-D	17LP4	470775
1062F	120239-F	17LP4	470785
1062H	120239-F	17LP4	470785
1064D	120239-D	17LP4	470775
1104D	120251-D	21YP4	470794
1106D	120254-D	21AUP4A	470794
1106F	120254-D	21AUP4A	470794

CH. 120239-F, 120251-D, 120254-D

NEW VHF TUNER

Chassis 120239-F, 120251-D and 120254-D use an alternate tuner (part #470785 or #470794). A schematic of this tuner is given in this bulletin.

Ch. 120220-D, 120239-D, 120239-F, 120251-D, 120254-D

TO ELIMINATE A HUM BAR IN THE RASTER

On non-synchronous programs, a horizontal hum bar may move vertically in the background at a rate equal to the difference in frequency between the power fed to the transmitter and the receiver.

To eliminate this possibility a .047MFD, 400V capacitor is added from the junction of R23 and R25 to ground.

Chassis incorporating this change are coded as follows:

120220-D △B　　120251-D Initial Production

120239-D △B　　120254-D Initial Production

120239-F △A1 and △C1

Ch. 120220-D, 120239-D, 120239-F

TO IMPROVE AUDIO RESPONSE

A .0022MFD, 400V capacitor is added across the volume control (R1B).

C55 is decreased from .0047MFD to .001MFD.

C57 is increased from .0047MFD to .01MFD.

R54 (6.8KΩ) is connected from pin 5 of V9 to the high side of the volume control.

Chassis incorporating these changes are coded as follows:

EMERSON MODELS 1030D, 1032D, 1058D, 1060D, 1060F, 1062D, 1062F, 1062H, 1064D, 1104D, 1106D, 1106F

PRODUCTION CHANGES
BULLETIN 132

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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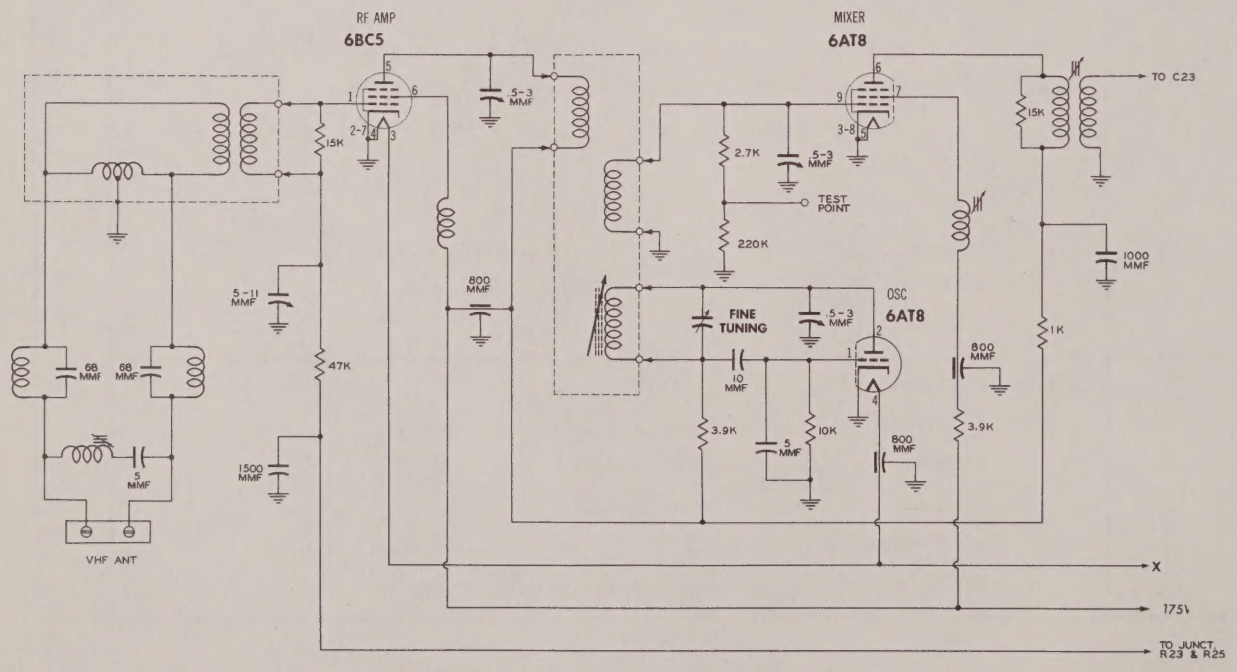
	120220-D (C) 120239-F Initial Production 120239-D (C) In later production due to variations in 12AX7 tubes an audio buzz was noticeable. This was eliminated by omitting R54 and the .0022MFD capacitor shunting the volume control, and changing C55 back to its original value. C57 remains a .01MFD. Chassis incorporating these changes are coded as follows: 120239-D (G) 120251-D Initial Production 120220-D (G) 120254-D Initial Production 120239-F (B)
Ch. 120220-D, 120239-D, 120239-F, 120251-D 120254-D	COMPONENT CHANGE To simplify servicing R98 is replaced by individual resistors having the same wattage and resistance rating. Chassis incorporating this change are coded as follows: 120220-D (D) 120251-D Initial Production 120239-D (D) 120254-D Initial Production 120239-F Initial Production
Ch. 120239-F 120251-D 120254-D	AUDIO BUZZ In chassis 120239-F an audio buzz may appear in a strong signal area due to the tuner overloading. To correct this R25 was increased from 10Meg to 15Meg. Chassis incorporating this change are coded as follows: 120239-F (D) 120254-D Initial Production 120251-D Initial Production



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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 278

WELLS-GARDNER MODELS 321AM57-A-436-1, 321AM57-A-470-1, 321AS57-A-436-1, 321AS57-A-470-1, 2321AM57-A-438-1, 2321AM57-A-494-1, 2321AS57-A-438-1, 2321AS57-A-494-1

Wells Gardner models 321AM49-A-436, 321AM49-A-470, 2321AM49-A-438 and 2321AM49-A-494 were covered in Photofact Folder 13 — Set 278.

Models 321AM57-A-436-1, 321AM57-A-470-1, 321AS57-A-436-1, 321AS57-A-470-1, 2321AM57-A-438-1, 2321AM57-A-494-1, 2321AS57-A-438-1 and 2321AS57-A-494-1 are electrically identical , except for the following changes:

NEW PICTURE TUBE

A 21AWP4 picture tube is used in models 321AM57-A-436-1, 321AM57-A-470-1, 2321AM57-A-438-1 and 2321AM57-A-494-1.

A 21AVP4A picture tube is used in models 321AS57-A-436-1, 321AS57-A-470-1, 2321AS57-A-438-1 and 2321AS57-A-494-1.

COMPONENT CHANGE

R37 is increased from 33KΩ to 100KΩ.

R85 is decreased from 15KΩ to 8.2KΩ.

L9 (4th. Video IF Coil) changed to part #9A2345.

A 100KΩ, $\frac{1}{2}$ watt resistor is added from pin 6 of V20 to the 245V line when V20 is a 21AVP4A.

T5 (Deflection Yoke) changed to part #9A2334-3 in models 321AS57-A-436-1, 321AS57-A-470-1, 2321AS57-A-438-1 and 2321AS57-A-494-1.

NEW HORIZONTAL OUTPUT TRANSFORMER

The horizontal output transformer (T3) is changed to part #53X347. Replacement transformers and correct terminal connection data are given below and on the reverse side.

HALLDORSON	MERIT	RCA	RAM	STANCOR	THORDARSON	TRIAD
FB411 * & RF800	HVO-9 * & MWC-1	232T1 *	X110 *	A-8264 *	FLY-37 *	D-35 *

(Con't on reverse side)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 11 IN SET 274

PACKARD-BELL MODELS 17101, U, 17104, U, 21102, U, 21204, U, 21206, U, 21402, U

Packard-Bell models 17101, U, 17104, U, 21102, U, 21201, U and 21204, U (Ch. T-10) were covered in Photofact Folder 11 — Set 274.

Models 21206, U and 21402, U (Ch. T-10) are added in this bulletin along with all current production changes.

Production changes made in chassis T-10 are divided into two groups, early and late. Following is a concise picture of all changes:

EARLY CHANGES

TO STABILIZE RATIO DETECTOR

R41 is increased from 1000Ω to 10KΩ.

TO IMPROVE VERTICAL LINEARITY AND SYNC STABILITY

C44 is increased from .002MFD to .01MFD.

R58 is increased from 1.5Meg to 2.2Meg.

R61 (8.2KΩ) is added from pin 6 of V10 to ground.

R59 is decreased from 33KΩ to 18KΩ.

R70 is increased from 270KΩ to 470KΩ.

TO IMPROVE HORIZONTAL STABILITY

C39 and R56 are added from pin 7 of V10 to C37.

COMPONENT CHANGE

R24 is increased from 3.3KΩ to 6.8KΩ.

R63 and R88 are increased from a 1 watt to a 2 watt rating.

TO PREVENT PICTURE COMPRESSION

A 3.3KΩ resistor, which formerly connected from terminal "B" of M7 to the 200V line is omitted. At the same time R26 is added from pin 6 of V5 to the 200V line.

TO REMOVE VERTICAL BARS IN PICTURE

R45 is inserted in picture tube grid lead (pin 2 of V18).

TO INCREASE HORIZONTAL SWEEP

C59 is increased from 56MMF to 120MMF.

(Con't on reverse side)

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	6	9	9	10	13	6	13	10
	5	8	8	8	Jumper 10 & 11	5	Jumper 10 & 11	8
	4	5	5	6 or 7	6	4	6	6 or 7
	3	See Note ②	See Note ②	See Note ②	5 or 4	3	5 or 4	See Note ②
	1	1	1	3	1 or 2	1	1 or 2	3
	A	Term. #3 of RF800	Orange Term. of MWC-1	2	9	A	9	2
	G	Term. #4 of RF800	Black Term. of MWC-1	1	8	G	8	1
Connect Width Coil Across →	2 & 1	Term. #1 & #2 of RF800 across "T" & 1	Red & blue terms. of MWC-1 across "T"&1					
Special Notes →		①②③	①②③	①②				①②④

① Drill new mounting holes.
② Connect a 47MMF or 56MMF capacitor from open end of R86 (original terminal #3 connection) to terminal #3 of yoke (red lead).
③ If the picture is out of phase, reverse width coil primary or secondary.
④ Jumper terminals #9 and "T".

COMPONENT CHANGES

Due to the variation in resistance of the vertical hold control (R2), R68 may be 470KΩ.

LATE CHANGES

TO IMPROVE VERTICAL LINEARITY AND SYNC STABILITY

C26 is increased from .05MFD to .22MFD.

R25, originally 120Ω is now decreased from 330Ω to 270Ω.

R57 is increased from 150KΩ to 330KΩ.

R59 was formerly 3 watts, wire wound. It is now composition, 2 watts; but clamped to the chassis with clamp #28139 which dissipates the heat to the chassis. R16 is clamped to the chassis in the same manner.

COMPONENT CHANGE

T3 (Horizontal Output Transformer) is changed to part #89457 to improve the performance of the receiver. These transformers are directly interchangeable.

R37 is decreased from 3.3KΩ to 2.2KΩ. Later R1A (contrast control) is reduced to 1.5KΩ and R37 is omitted.

R30 is increased from 3.3Meg to 4.7Meg.

TO IMPROVE INTERLACE

A .047MFD, 400V capacitor is added from the junction of R12 and R16 to ground.

COMPONENT CHANGE

In sets using an all channel tuner, C25A and C25B are replaced by two single .01MFD. capacitors. Also, in these sets a 1KΩ resistor is added between terminal "B" of M7 and the 200V line.

M9 (centering magnet) is replaced by centering magnets mounted on the yoke cover (part #34045).

R70 is decreased from 470KΩ to 270KΩ.

In UHF-VHF sets the tuner has been changed to part #10540.

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

ADMIRAL CHASSIS
20XP5, A, 20X5A, CZ, EZ

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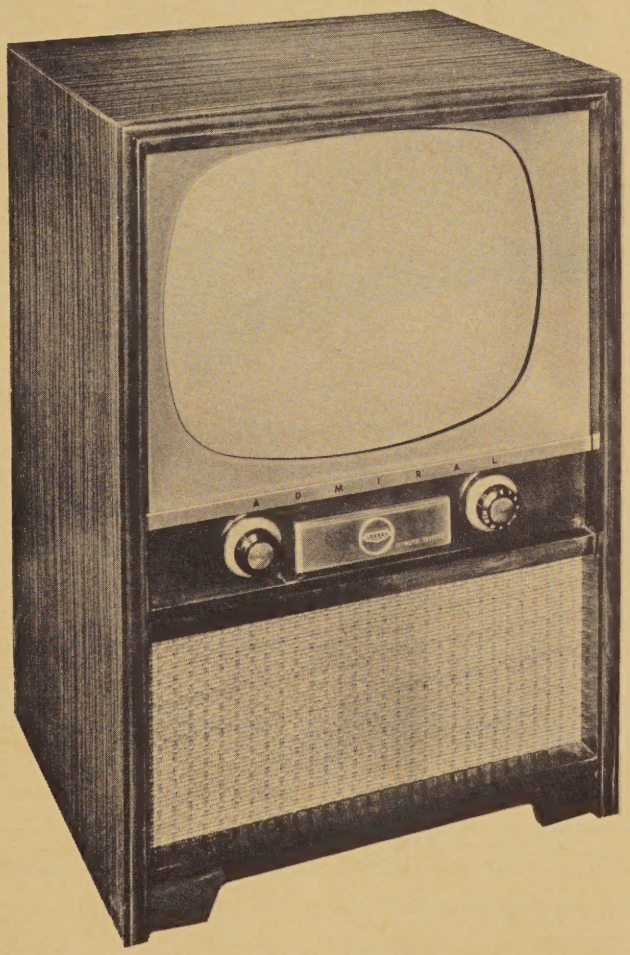
The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL C2306BZ

ADMIRAL CHASSIS
20XP5, A, 20X5A, CZ, EZ

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DATE 10–55 SET 291 FOLDER 2

ADMIRAL CHASSIS 20XP5, A, 20X5A, CZ, EZ

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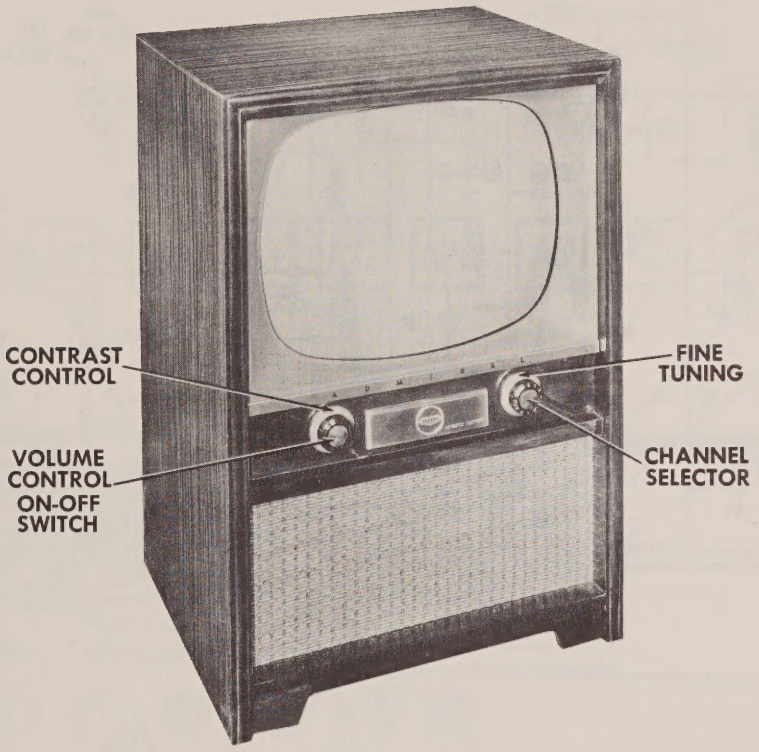

ADMIRAL MODEL C2306BZ

TRADE NAME	Admiral	MODELS	CHASSIS	TUNER
		T1812B	20XP5	94D52-2
		T2212B	20XP5A	94D52-2
		C2256	20X5A	94D46-3
		T2242BZ	20X5CZ	94D46-3
		C2306BZ, C2306Z, C2307BZ, C2307Z	20X5EZ	94D46-3
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Ill.			
TYPE SET	Television Receiver			
TUBES	Twenty			
POWER SUPPLY	110-120 Volts AC-60 Cycles		RATING 1.37 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 25.75MC, Sound IF 21.25MC (Intercarrier)			

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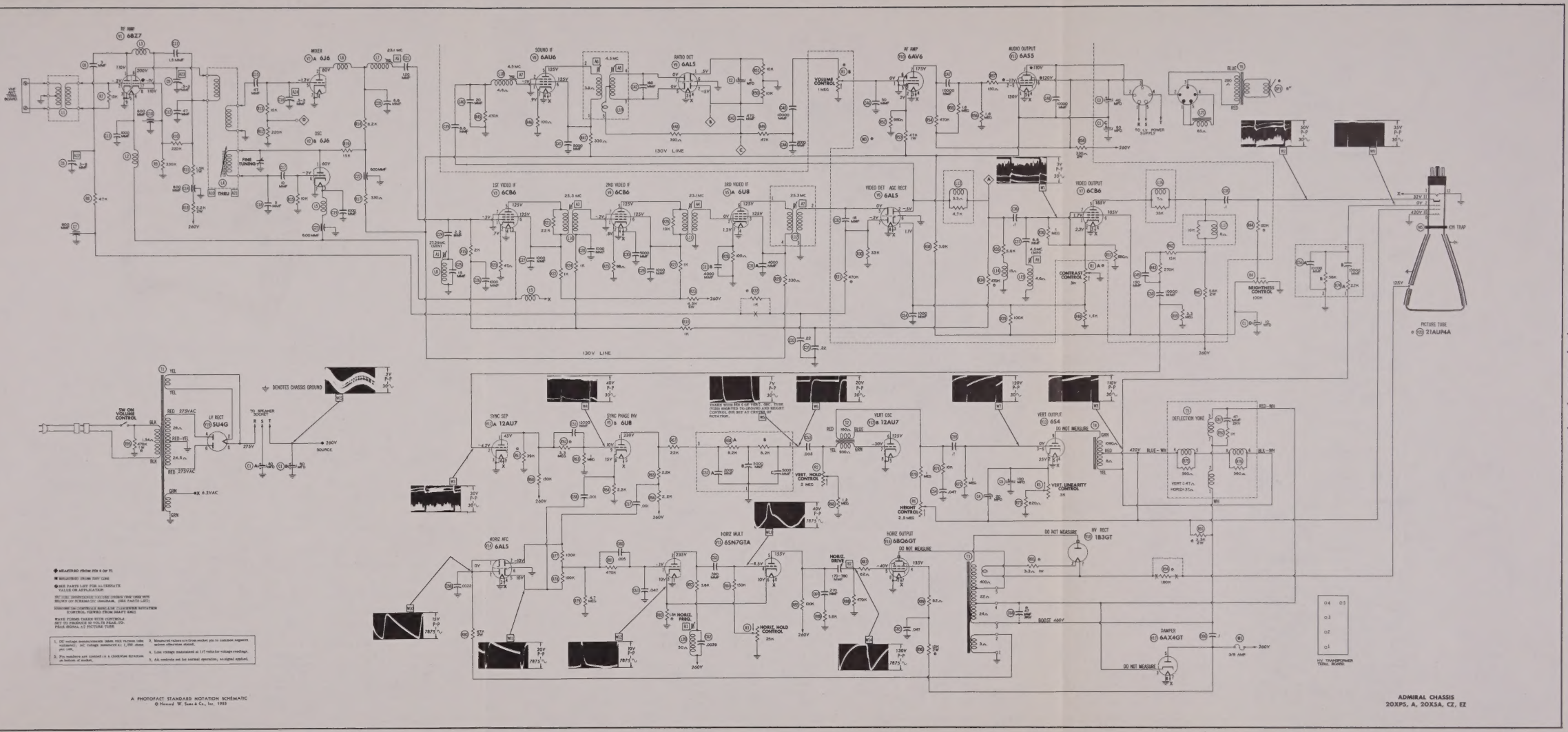
ADMIRAL CHASSIS 20XP5, A, 20X5A, CZ, EZ


ADMIRAL CHASSIS
20XP5, A, 20X5A, CZ, EZ
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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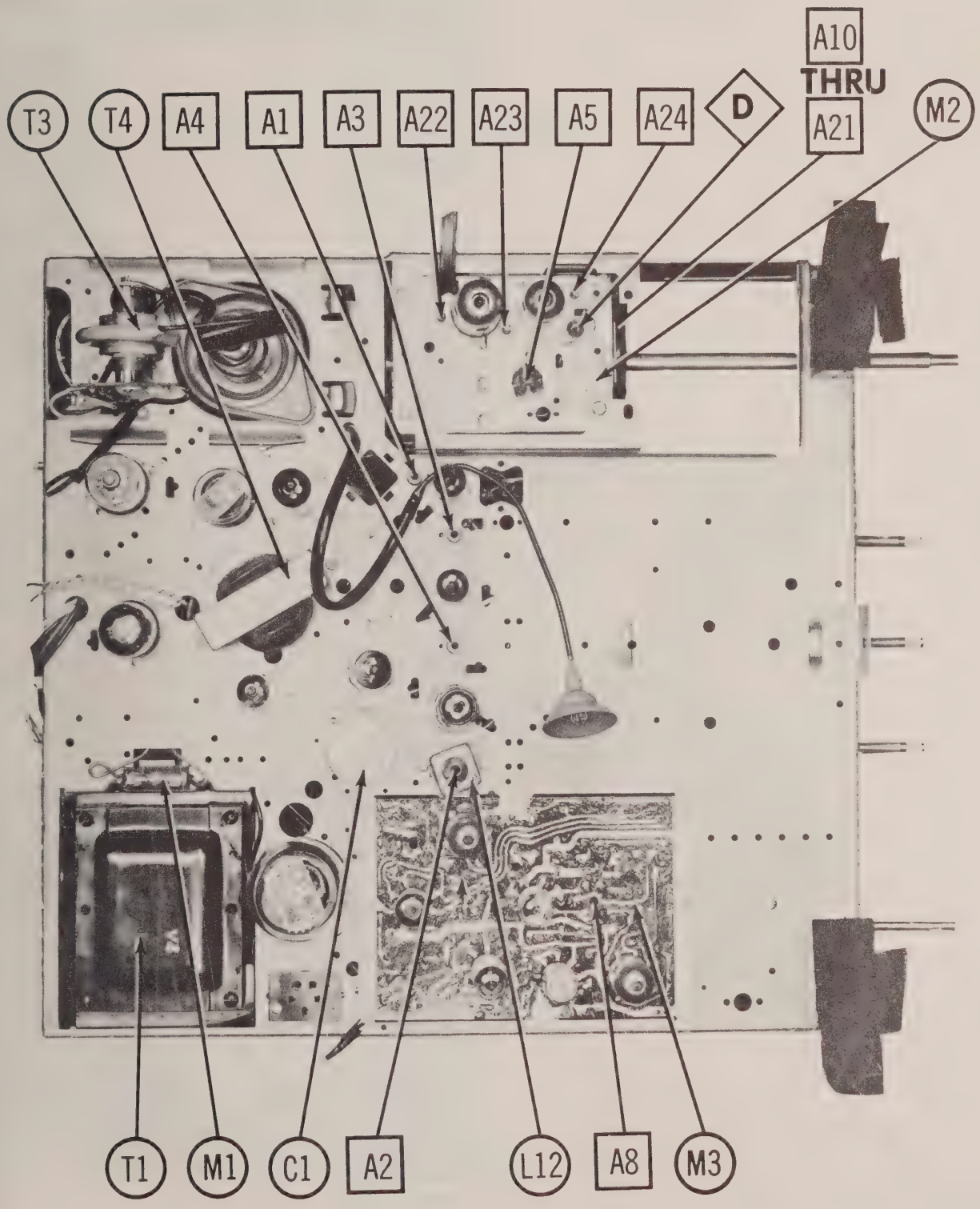
ADMIRAL CHASSIS
20XP5, A, 20X5A, CZ, EZ



CHASSIS TOP VIEW

SET 291 FOLDER 2

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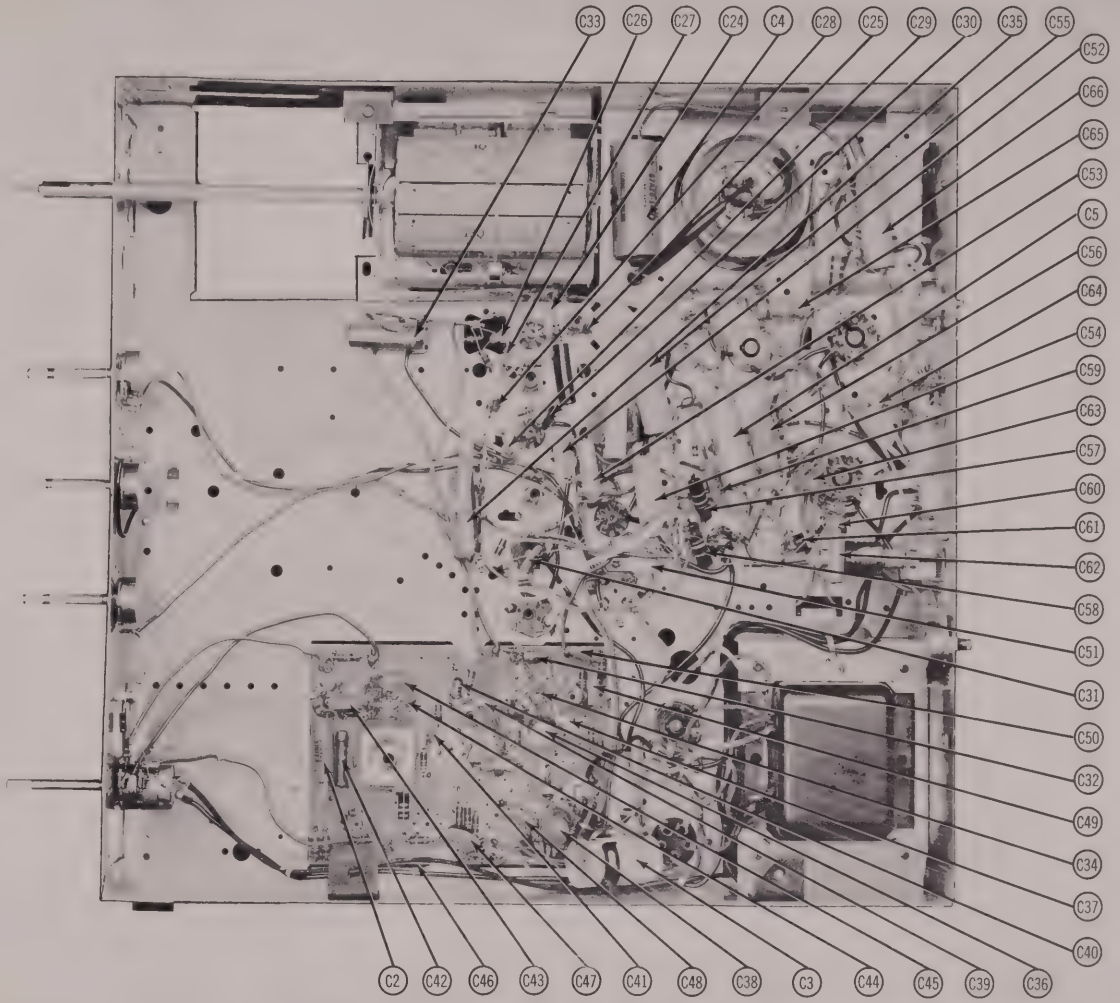

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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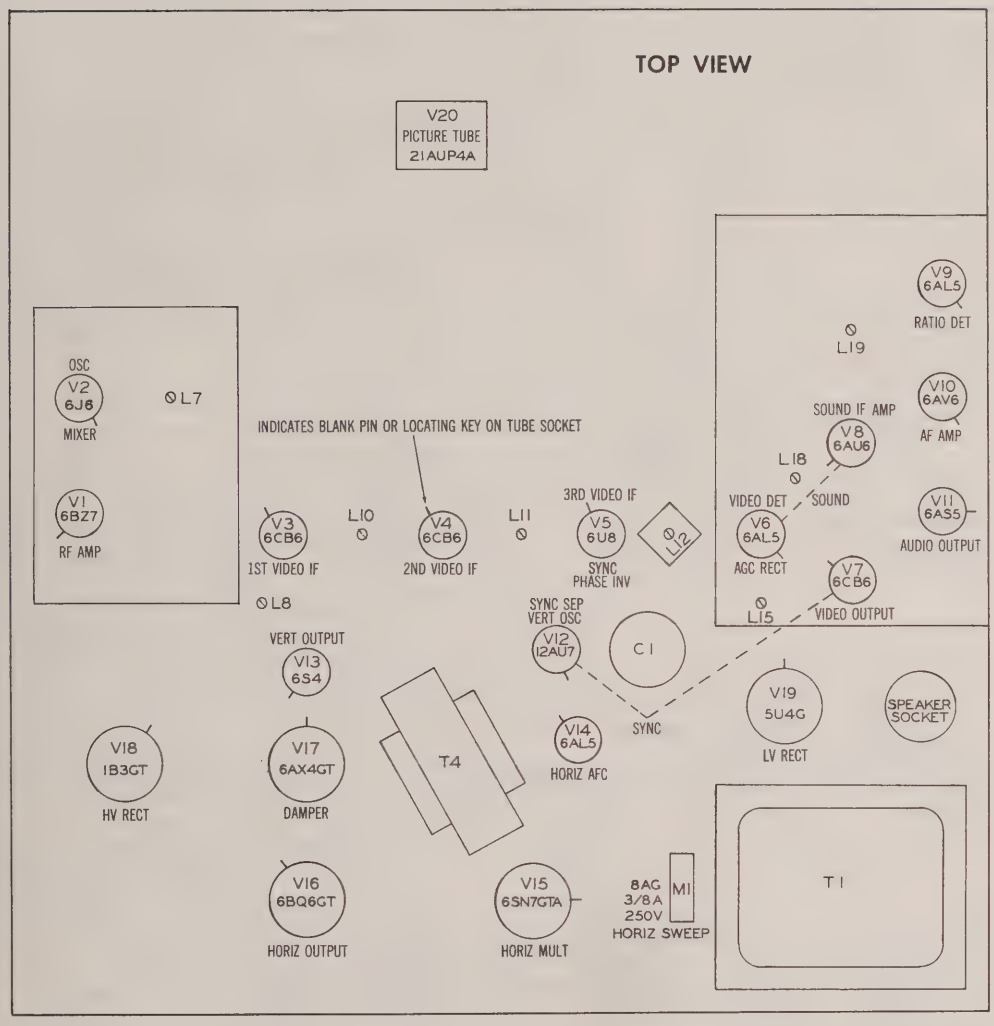
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V11**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V20**
Has pic, no sound - **V8, V9, V10, V11**

SYNC FAILURE
No vert. sync - **V5, V12**
No horiz. sync - **V5, V14, V15**
No vert. or horiz. sync - **V5, V12**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20, Fuse (M1)**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V5, V12**
Horiz. off freq. - **V5, V14, V15**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V15) to disable the high voltage. Allow a 15 minute warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C35. Connect positive lead to chassis.
Disconnect the antenna and short the antenna terminals with a short jumper.
Set the contrast control for minimum contrast.
Use only enough signal generator output for usable indication on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	27.25MC (Unmod)	Any	DC probe thru decoupling filter (Fig.1) to point Ⓐ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	25.3MC	"	"	A2, A3	Attenuate generator output to maintain not more than 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	23.1MC	"	"	A4, A5	"

OVERALL VIDEO IF RESPONSE CHECK

Leave bias connected as under "Video IF Alignment".
Use only enough sweep generator output for usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	22.0MC 24.2MC 25.75MC 27.25MC	Any	Vert. Amp. thru decoupling filter (Fig.1) to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig.2. If necessary retouch A2 thru A5 to obtain desired response. Retouch A2 and A3 for correct peak and position of 25.75MC marker on high frequency side of response curve. Retouch A4 and A5 for correct peak and position of 22MC marker on low frequency side of response curve. Increase sweep generator output enough to observe 27.25MC trap notch. If necessary retouch A1 to place 27.25MC trap marker in trap notch as in Fig. 2.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 2 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A6, A7	Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Final adjustment of A8 may be made by tuning in a TV station and adjusting A8 for clearest sound and minimum buzz.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 2 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A6, A7	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
6.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A8	Reconnect stabilizing capacitor C2. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

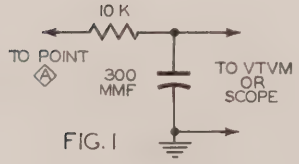


FIG. 1

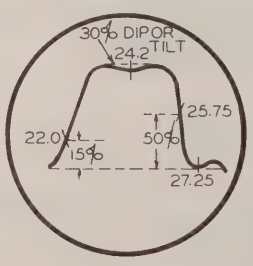


FIG. 2

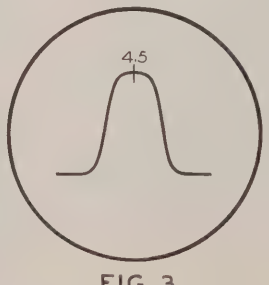


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

4.5MC TRAP ALIGNMENT

Connect a short clip lead across L13.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to pin 2 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A9	Adjust for MINIMUM deflection. Remove short from across L13.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust A9 for minimum 4.5MC beat interference in the picture.

VHF OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace original 6J6 in its socket if not previously replaced.
The channel oscillator adjustment screws are reached thru a hole just to the right of the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru decoupling filter (Fig. 1) to point (A). Low side to chassis.	A10	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A11	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A12	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A13	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A14	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A15	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A16	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A17	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A18	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A19	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A20	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A21	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded C33.
Connect the positive lead to chassis. If a usable indication cannot be obtained on scope, remove the bias supply and short the ungrounded side of C33 to chassis with a short jumper.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (D). Low side to tuner chassis.	A22, A23, A24	Adjust for response curve similar to Fig.6 with markers above 90%.
10.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13			Check each channel for response similar to Fig.6. If markers fall below 70% on any channel make compromise adjustments of A22, A23 and A24 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

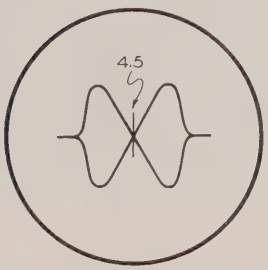


FIG. 4

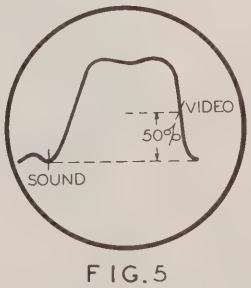


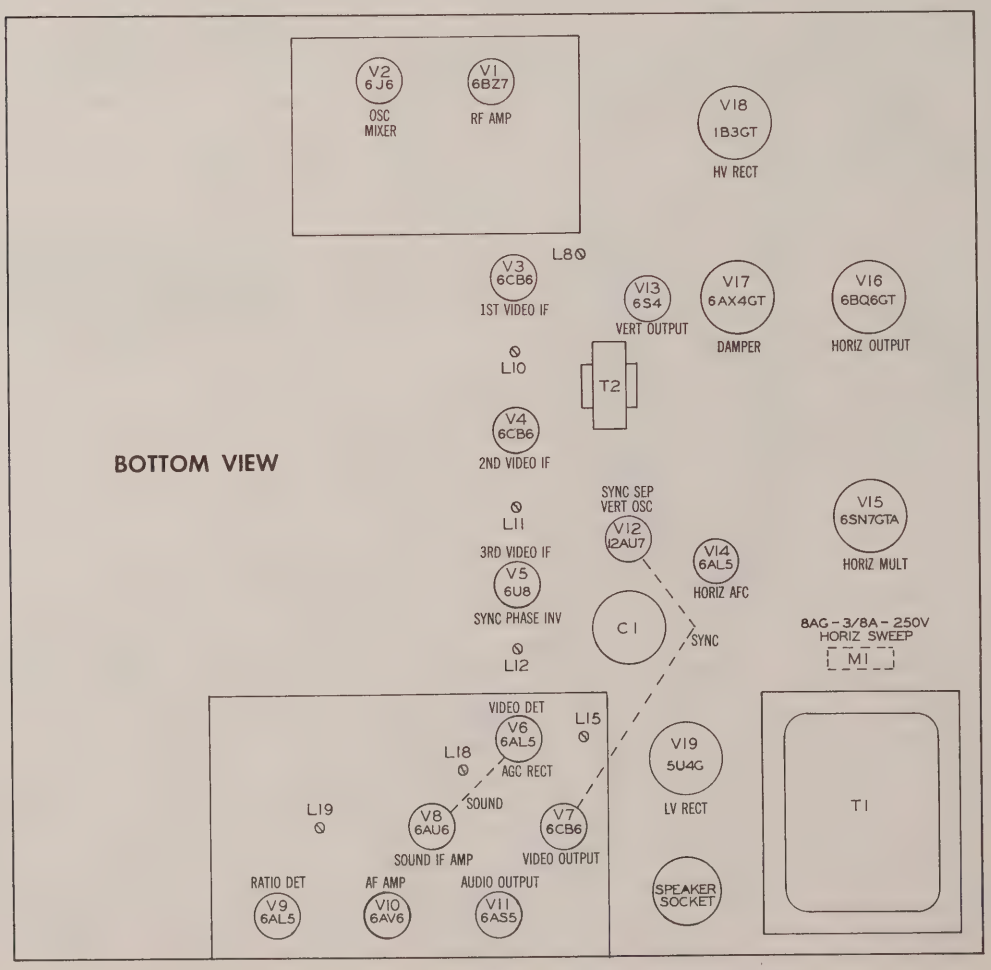
FIG. 5

FIG. 6

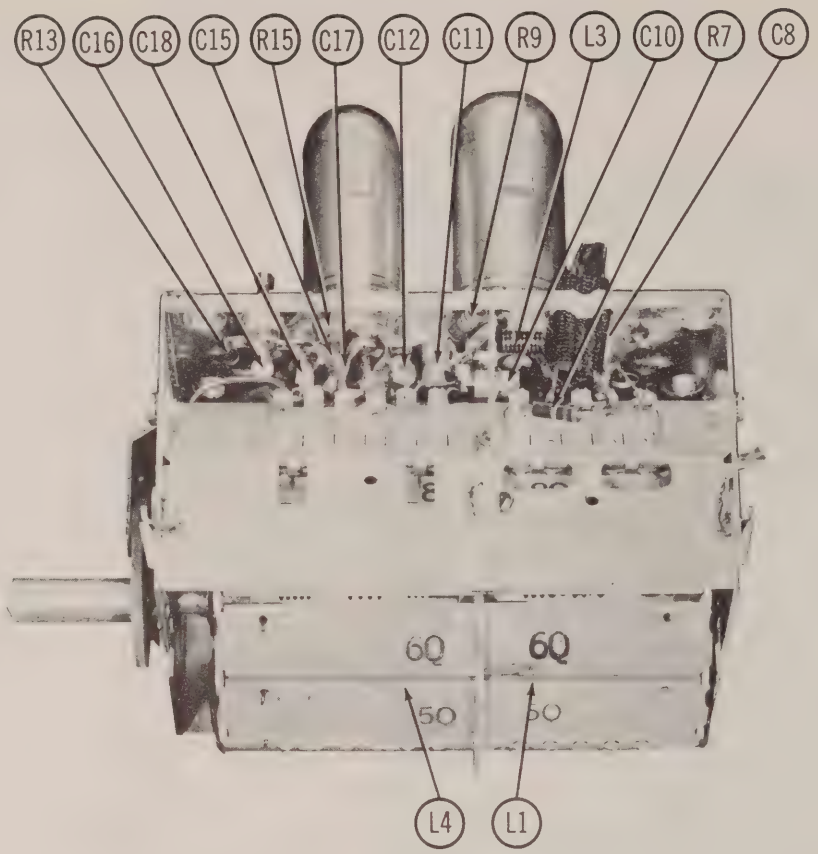
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	INF	550KΩ	0Ω	.1Ω	0Ω	†3.7KΩ	170KΩ	INF	0Ω
V 2	6J6	■15KΩ	■8.5KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	470KΩ	47Ω	.1Ω	0Ω	†5.5KΩ	†5.5KΩ	0Ω		
V 4	6CB6	470KΩ	68Ω	.1Ω	0Ω	†5.5KΩ	†5.5KΩ	0Ω		
V 5	6U8	†4.4KΩ	.4Ω	■330Ω	0Ω	.1Ω	■330Ω	100Ω	2.2KΩ	1Meg
V 6	6AL5	1.1KΩ	5.6KΩ	.1Ω	0Ω	.4Ω	0Ω	33KΩ		
V 7	6CB6	1Meg	160Ω	0Ω	.1Ω	†5.6KΩ	■3.9KΩ	160Ω		
V 8	6AU6	470KΩ	0Ω	.1Ω	0Ω	■330Ω	■330Ω	100Ω		
V 9	6AL5	10KΩ	10KΩ	0Ω	.1Ω	INF	0Ω	INF		
V 10	6AV6	300KΩ	680Ω	0Ω	.1Ω	0Ω	0Ω	†470KΩ		
V 11	6AS5	30KΩ	1Meg	0Ω	.1Ω	1Meg	†400Ω	†800Ω		
V 12	12AU7	†35KΩ	3.3Meg	0Ω	0Ω	0Ω	▲2.2Meg	2Meg	0Ω	.1Ω
V 13	6S4	NC	2KΩ	1Meg	.1Ω	0Ω	1Meg	NC	NC	▲4.4KΩ
V 14	6AL5	47KΩ	47KΩ	0Ω	.1Ω	4.8Meg	0Ω	4.8Meg		
V 15	6SN7GTA	5Meg	†5.6KΩ	1.5KΩ	180KΩ	†100KΩ	1.5KΩ	0Ω	.1Ω	
V 16	6BQ6GT	TP	0Ω	NC	†15KΩ	470KΩ	TP	.1Ω	0Ω	TOP CAP ▲22Ω
V 17	6AX4GT	NC	NC	350KΩ	NC	†70Ω	NC	.1Ω	0Ω	
V 18	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲422Ω
V 19	5U4G	NC	30KΩ	NC	26Ω	NC	25Ω	TP	30KΩ	
V 20	21AUP4A	.1Ω	56KΩ	PIN 6 0Ω	PIN 10 ▲3.3KΩ	PIN 11 150KΩ	PIN 12 0Ω			

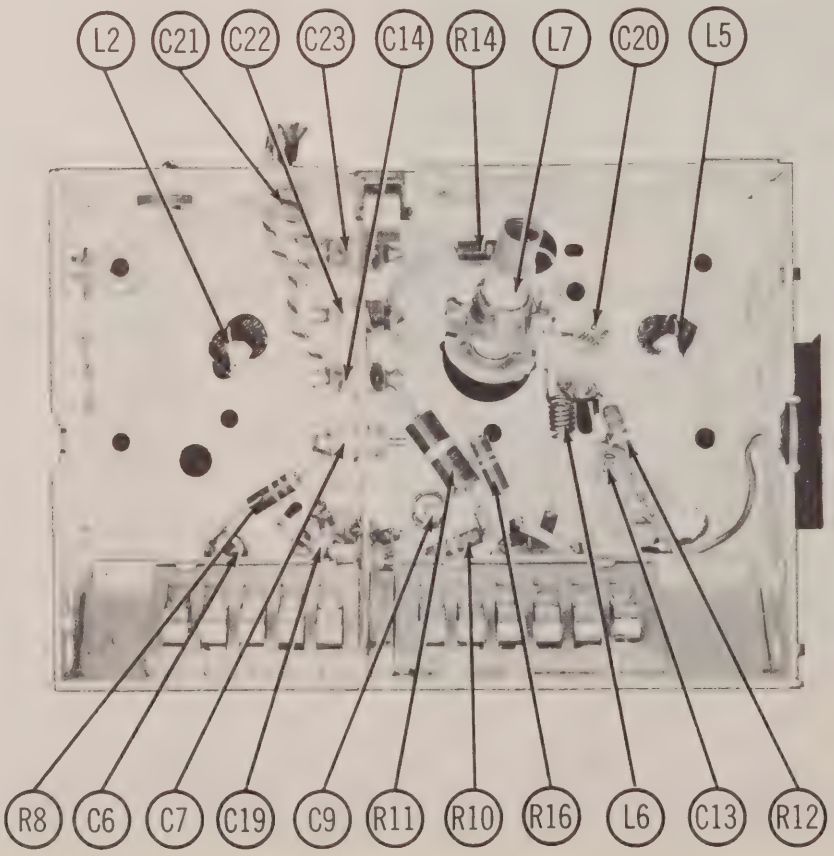
† MEASURED FROM PIN 8 OF V19.
■ MEASURED FROM 130V LINE .
▲ MEASURED FROM PIN 3 OF V17.
TP - TIE POINT
NC - NO CONNECTION



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

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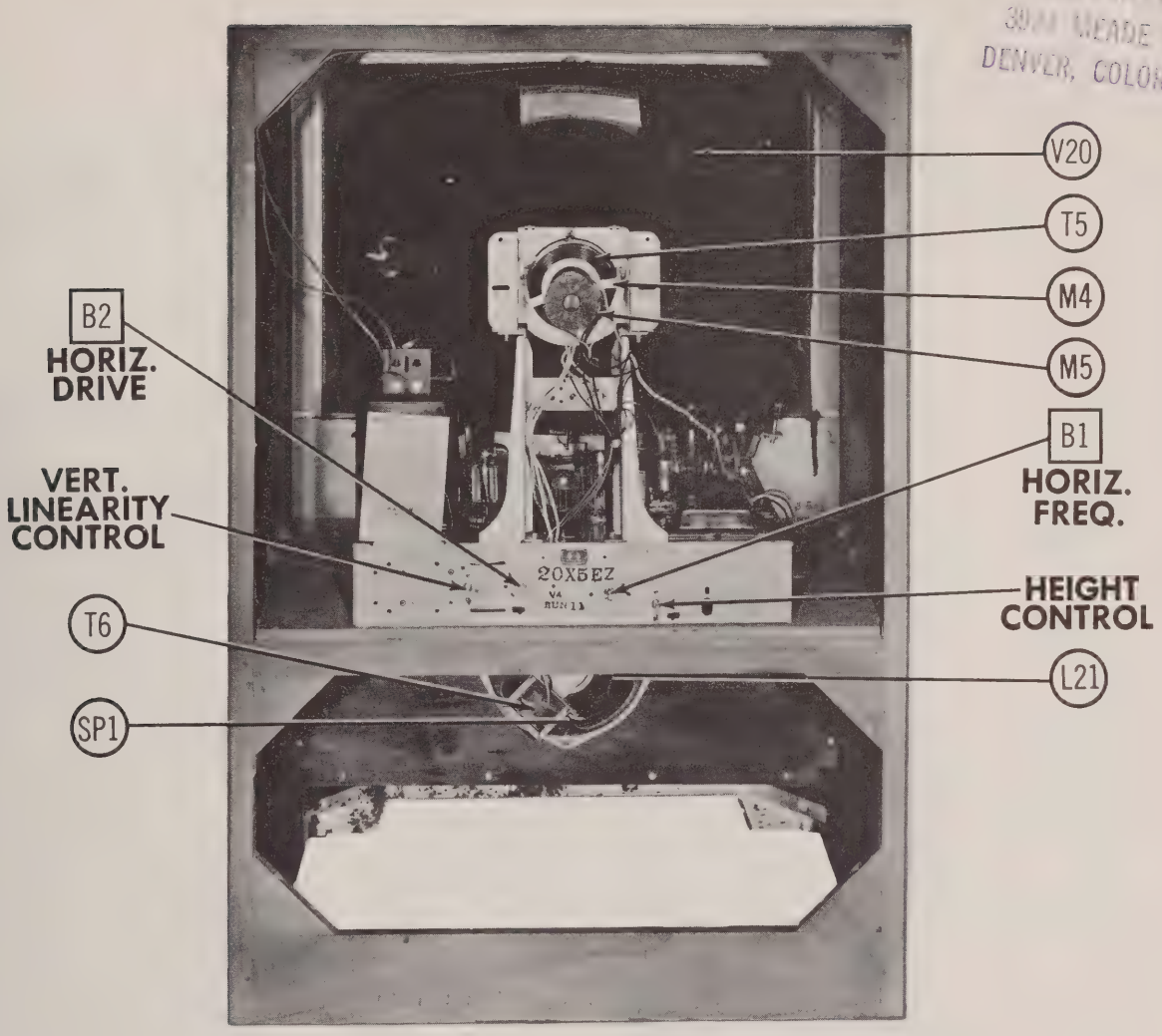
3044 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station, preferably a test pattern. Switch channel selector on and off available TV stations. If the horizontal hold control will not keep picture in sync over approximately three-fourths of its range adjust as follows:

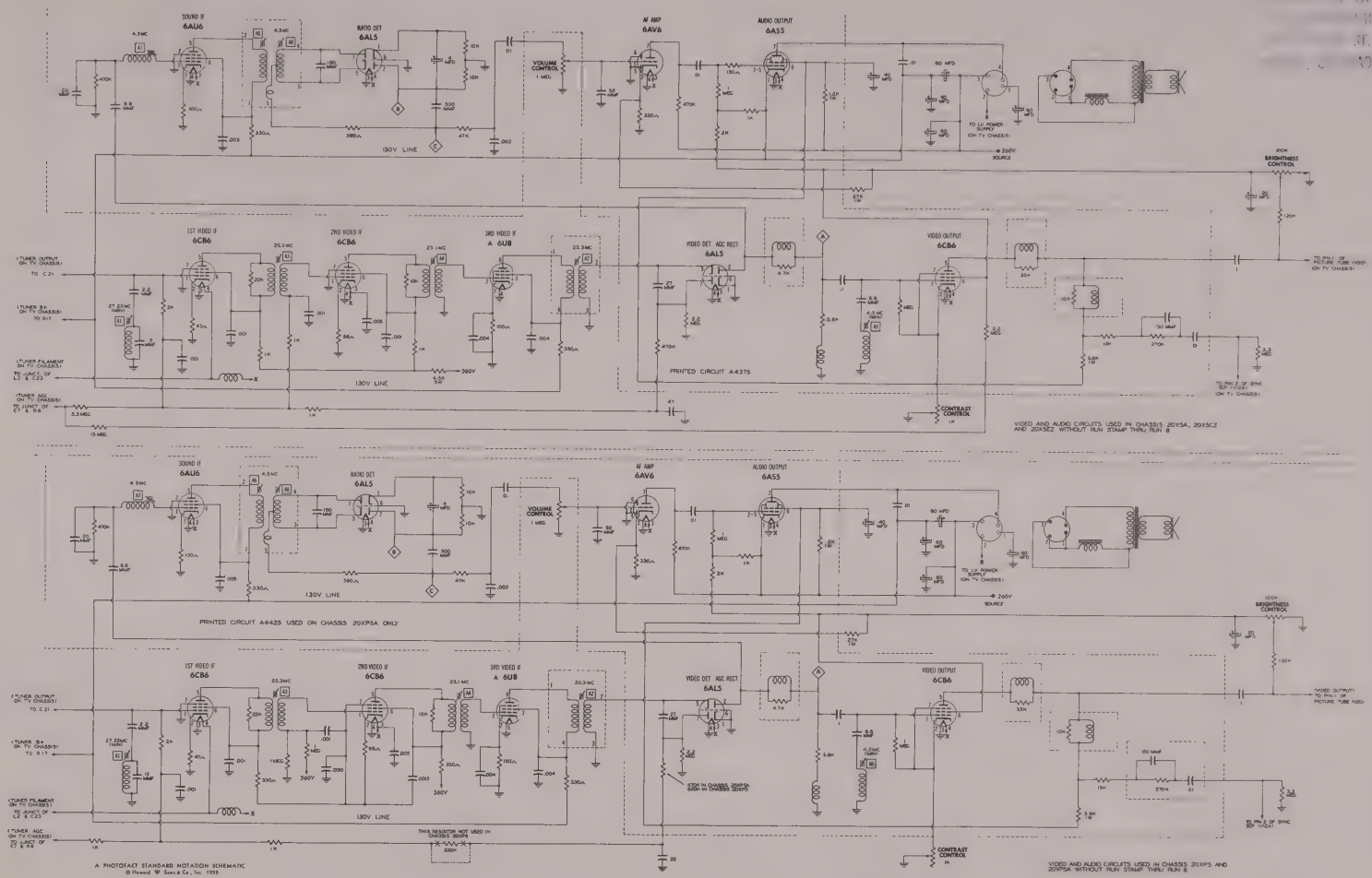
1. Set the brightness and contrast controls for a normal picture. Turn the horizontal hold control fully counter clockwise.

2. Turn the horizontal drive trimmer (B2) clockwise as far as possible without the presence of a white vertical line or compression near left side of picture.

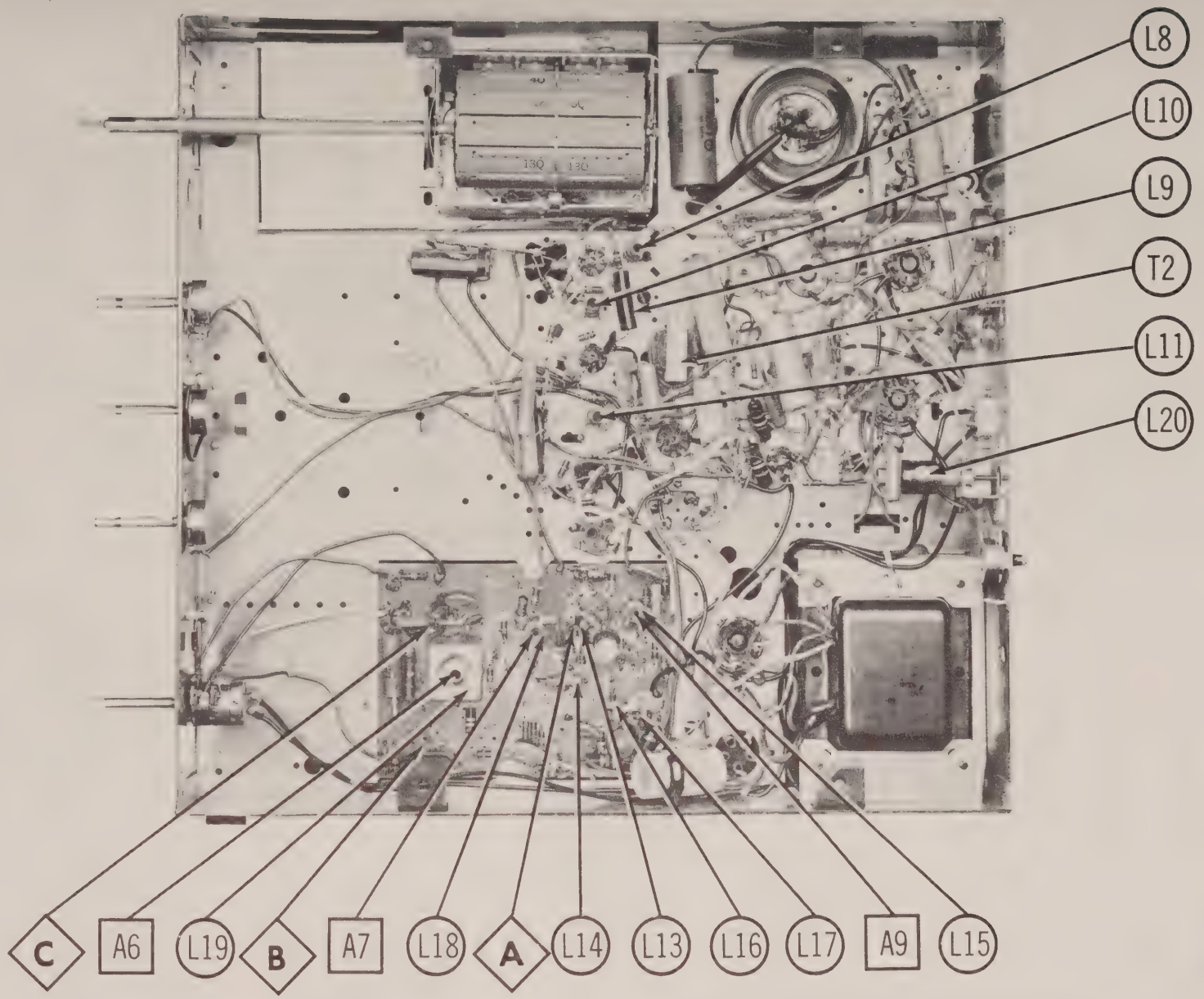
3. Turn the horizontal frequency slug (B1) clockwise until the picture loses sync. It may be necessary to switch-off channel, then back again for picture to lose sync.

4. Turn B1 slowly counter clockwise until picture just falls into sync.

5. To check for satisfactory operation slowly rotate the horizontal hold control over its entire range while interrupting the signal by switching off channel, then back. The picture should fall into sync thru approximately three-fourths of its range.



ALTERNATE VIDEO IF AND SOUND IF SCHEMATIC.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

ADMIRAL CHASSIS
20XP5, A, 20X5A, CZ, EZ

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V16, V17 and V19. Check adjustment B2. Check R85, R90, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V16 and V17. Check adjustment B2. Check R90, T3, T5A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V16 and V17. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V15, V16 and V17. Check C61 for open. Check C60, R81, L20 and other associated components.

XMAS TREE EFFECT

Check by substitution V15, V16 and V17. Check T3 and T5 for internal arcing. Check C59, C62, C63, R80, R82, L20 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V12 and V13. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, C4, R73 and other associated components.	Check T2, C55, C53, R6, R70, R69 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check height and vertical linearity controls for proper operation. Check T4, R70 and other associated components.

COMPRESSED AT BOTTOM

Check by substitutionn V12 and V13. Check R6, R70, C55 and other associated components.

COMPRESSED AT TOP

Check by substitution V12 and V13. Check C5, C4, R73, R5, T4 and other associated components.

FOLDS

Check by substitution V12 and V13. Check C55, C54, R71, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V12 and V5. Check C49, C50, C51, R60, R66, R65 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V12. Check vertical integrator network. Check R69, R2, C53 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V14 and V15. Check C57, C58, C60, C61, R84, R81, L20 and other associated components.

HORIZONTAL BENDING

Check by substitution V5, V12, V14 and V15. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V7. Check R38, R41, C36, C38 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check video IF alignment.

POOR CONTRAST

Substitute V7. Check contrast control. Check R40, R37, L13, L16, L17, C36, C38 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check C36, C38, L13, L14 and other associated components.

SMEAR

Substitute V7. Check L13, L14, L16, L17, C36, C38 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by subsittution V8, V9, V10 and V11. Check stages V10 and V11 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C45, C47, C48, C3, C1C, R54, R58, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A8 for minimum buzz. If still unsatisfactory, check C2 and audio IF alignment.

DISTORTED

Follow procedure outlined under Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch or volume control and T1. If filaments light, substitute V19. Check B+ filter and decoupling network.

SMALL AND/ON DIM PICTURE

Substitute V19. Check B+ filter and decoupling nttwork.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Mixer-Osc.	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.-Sync Phase Inv.	6U8	6U8	9AE	
V6	Video Det.-AGC Rectifier	6AL5	6AL5	6BT	
V7	Video Output	6CB6	6CB6	7CM	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det.	6AL5	6AL5	6BT	
V10	AF Amplifier	6AV6	6AV6	7BT	
V11	Audio Output	6AS5	6AS5	7CV	
V12	Sync Separator-Vertical Osc.	12AU7	12AU7	9A	
V13	Vert. Output	6S4	6S4	9AC	
V14	Horiz. AFC	6AL5	6AL5	6BT	
V15	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V16	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V17	Damper	6AX4GT	6AX4GT	4CG	
V18	HV Rectifier	1B3GT	1B3GT	3C	
V19	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ADMIRAL PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V20	21AUP4A①	21AUP4A ①		21AUP4A ②		12L	① Aluminized
				21AUP4		12L	② Silver screen
	21XP4	21XP4		21XP4		12L	
				21XP4A ②		12L	
	21YP4	21YP4	21YP4	21YP4	21YP4	12L	
		21YP4A ①	21YP4A ①	21YP4A ②	21YP4A ①	12L	
	17HP4	17HP4/17RP4	17RP4/17HP4	17HP4/17RP4	17HP4/17RP4	12L	
				17HP4B ②		12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ADMIRAL PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	▲60	350	67D15-111			FP331.3	TM-806060-350	T-115	
B	■80	350				TC42		FM-1512	
C	▲60	200					TD-10-150		
D	10	150							
C2	4	50	67A27-2			TC30	TD-4-50	MMT-0505	
C3	40	200	67A4-21			TC58	TD-40-250	FM-2540	
C4	20	475	67A25-1			TC83	TD-20-475	MT-4710	
								MT-4710	
C5	100	50	67B19-7			TC3501	TD-100-50	MTH-5010	
C6	3-9		98A45-96	829-10					
C7	800		94C37-90						
C8	3		94D47-54	TCZ-3R3	NP0A-030	ZT-5533			
C9	.5-3		98A45-23	829-3	3115-01-0R5	CT565A			
C10	800		94C37-90						
C11	1.5		94D46-84	TCZ-1R5	NP0A-1R5	ZT-5515			
C12	47		94D47-50	DD-470	831-470	UC-5447			
C13	1000		98A45-24	DD-102	801-001	DC-521			
C14	800		94C37-90						
C15	47		94D47-50	DD-470	831-470	UC-5447			
C16	.5-3		98A45-23	829-3	3115-01-0R5	CT565A			
C17	10		98A45-64	TCN-10	N750K-100	NT-541			
C18	5		94D47-52						
C19	1000		98A45-24	DD-102	801-001	DC-521			
C20	6.8		94D47-53	TCZ-6R8	NP0A-6R8	ZT-5568			
C21	120		98A45-78	DD-121	811-121	UC-5312			
C22	800		94C37-90						
C23	800		94C37-90						
C24	2.2		65C6-86	TCZ-2R2	NP0A-2R2				
C25	15		65C6-90	TCZ-15	NP0K-150	ZT-5415		KR-1515	
C26	1000		65C6-41	D6-102	GP2L-102	UC-521		K-1210	
C27	1000		65C6-41	D6-102	GP2L-102	UC-521		K-1210	
C28	1000		65C6-41	DD-102	801-001	DC-521		K-1210	
C29	1000		65C6-41	D6-102	GP2L-102	UC-521		K-1210	
C30	5000		65C10-1	DD-502	811-005	DC-525		C-1250	
C31A	4000		65A17-1	D6-402	822-004	DCD-524			
B	4000			D6-402					
C32	18		65C6-91	TCZ-18	NP0K-180	ZT-5418			
C33	.22	200	64B9-37			PT4022	IMP4-P22	3304022	
C34	1000		65C6-41	D6-102	GP2L-102	UC-521		K-1210	
C35	.22	200	64B9-37			PT4022	IMP4-P22	3304022	
C36	.1	200	64B16-53	DF-104					
C37	6.8		65C6-71						
C38	.1	400	64B16-30	DF-104					
C39	6.8		65C6-71						
C40	20		65C6-51	TCZ-20	NP0K-200	ZT-542		KR-1420	
C41	5000		65C10-1	DC-525	811-005	DC-525		C-1250	
C42	180		65C6-59						
C43	470	500	65C6-6	D6-471	GP2K-471	MC245		K-1347	
C44	2000		65C10-39	DD-202	801-002	DC-522	IMP6-D2	C-1220	
C45	10000		65C10-3	DD-103	811-01	DC-511	IMP6-S1	330611	
C46	50		65C6-4	D6-500	GP1K-500	UC-545		K-1450	
C47	10000		65C10-3	DD-103	811-01	DC-511	IMP6-S1	330611	
C48	10000		65C10-41	DD-103	811-01	DC-511	IMP6-S1	330611	
C49	150	500	65B21-151	D6-151	GP2K-151	MC236		K-1315	
C50	10000		65C10-3	DD-103	811-01	DC-511	IMP6-S1	330611	
C51	10000		65C10-3	DD-103	811-01	DC-511	IMP6-S1	330611	

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DENVER, COLORADO

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA ADMIRAL Part No.	CENTRALAB Part No.	ERIE Part No.	MALLORY Part No.	PYRAMID Part No.	SANGAMO Part No.	NOTES
C52A	2000				801-002	DC-522	IMPS-D2	C-1220	
B	5000		♦63C6-11	+PC-105	811-005	DC-525	IMPS-D5	C-1250	
C	5000				811-065	DC-525	IMPS-D5	C-1250	
C53	.005	600	64B9-15	D6-502	GP2-333-502	PT625	IMPS-D5	330625	
C54	.047	600	64A11-1						
C55	.1	600	64B9-17	DF-104		PT501	IMPS-P1	330601	
C56A	10000		♦63C6-12	DD-103	811-01	DC-511	IMPS-S1	330611	
B	10000			DD-103	811-01	DC-511	IMPS-S1	330611	
C57	.001	600	64A2-24	D6-102	GP2L-102	PT621	IMPS-D1	330621	
C58	.001	600	64A2-24	D6-102	GP2L-102	PT621	IMPS-D1	330621	
C59	.0033	600	64B9-17	D6-223	GP2-333-223	PT6223	IMPS-D22	3306222	
C60	.005	600	64B9-15	D6-502	GP2-333-502	PT625	IMPS-D5	330625	
C61	.047	200	64B9-41	DF-503		PT4147	IMPS-S47	3302147	
C62	.0039	400	64A3-23			MC3H63		CR-1239	
C63	390	500	65B21-391	D8-391	811-391	MC3H243		KR-1339	
C64	270	500	65B21-271	TC2-270	NPO-335-271	MC3H241		KR-1327	
C65	.047	400	64B9-28	DF-503		PT4147	IMPS-S47	3304147	
C66	.1	600	64B9-7	DF-104		PT601	IMPS-P1	330601	
C67	47	3000	65C10-8	DD30-470	3KV-470	DC30447			
C68	47	3000	65C10-38	DD30-470	3KV-470	DC30447			Note 1

Note 1. Not used in some versions.
♦ Items C58A, C58B, C58C, R68A and R68B are combined in one unit.
† Items C56A, C56B, R74A and R74B are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	3000Ω	½	75B11-26	† QJ-765	R7V-517	F1-15	UF33R	Contrast-Panel-Note 2
B	1Meg	½				R2-54	UR18A	Volume-Attach to R1A-rear
C	Switch					KB-1	UB-26	Attach to R1B
R1A	1000Ω	½	75B11-21	♦QJ-397	R7V-335	F1-5	UF13L	Contrast-Panel-Note 1
B	1Meg	½				R2-54	UR18A	Volume-Attach to R1A-rear
C	Switch					KB-1	UB-26	Attach to R1B
R2A	2Meg	½	75C13-45	QU-139	A47-2Meg-S	AB-75	U-56	Vert. Hold
B	Shaft		Not Req.	Not Req.	RG	AK-6	Not Req.	Attach to R2A
R3A	35kΩ	½	75C13-64	QU-130	A47-35K-S	AB-58	U-39	Horiz. Hold
B	Shaft		Not Req.	Not Req.	RS-3	AK-4	Not Req.	Attach to R3A
R4A	100kΩ	½	75C13-43	QU-128	A47-100K-S	AB-60	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	3000Ω	½	75C10-7	QU-112	A47-3000-S	AB-5	U-6	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	2.5Meg	½	75C20-1	QU-239	BX-93	SU-255		Height
B	Shaft		Not Req.	RQ	FKS-1/4	Not Req.	Not Req.	Attach to R6A

Note 1. Used in chassis 20X5A, 20X5C2, 20X5EZ, 20XP5, 20XP5A (Run 6 or lower).
Note 2. Used in chassis 20X5A, 20X5EZ, (Run 9 or higher).
♦ CONCENTRIKIT EQUIVALENT: K-2 KIT, BASE ELEMENTS & SHAFTS. B1T-108, P1-126 (Panel)
B13-127, R2-213 (Rear)
SWITCH 76-1

•• Universal Replacement (Mallory exact duplicate part #UE-573).
♦ Universal Replacement (Mallory exact duplicate part #UE-1103).
† CONCENTRIKIT EQUIVALENT, K-2 KIT, BASE ELEMENTS & SHAFTS. B1T-112, P1-126 (Panel)
B13-127, R2-212 (Rear)
SWITCH 76-1

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	NOTES
R7	15kΩ	½	60B8-153	BTS-15K	
R8	47kΩ	½	60B8-473	BTS-47K	
R9	330kΩ	½	60B8-334	BTS-330K	
R10	220kΩ	½	60B8-224	BTS-220K	
R11	1500Ω	1	60B16-152	BTA-1500	
R12	220kΩ	½	60B8-224	BTS-220K	
R13	4500Ω	8	61A17-1	1.5/4A-4500	
R14	82000Ω 5%	½	60B8-822	BTS-8200 5%	
R15	10kΩ	½	60B8-103	BTS-10K	
R16	15kΩ	½	60B8-153	BTS-15K	
R17	330Ω	½	60B8-331	BTS-330	
R18	2200Ω	2	60B20-222	BTB-2200	
R19	20000Ω 5%	½	60B7-202	BTS-20000 5%	
R20	47Ω	½	60B28-45	BTS-47	
R21	33kΩ	½	60B8-333	BTS-33K	
R22	1000Ω	½	60B8-102	BTS-1000	
R23	4500Ω	8	61A17-1	1.5/4A-4500	
R24	1000Ω	½	60B8-102	BTS-1000	
R25	68Ω	½	60B28-44	BTS-68	
R26	10kΩ 5%	½	60B7-103	BTS-10K 5%	
R27	1000Ω	½	60B8-102	BTS-1000	
R28	100Ω	½	60B8-101	BTS-100	
R29	330Ω	½	60B8-331	BTS-330	
R30	33kΩ	½	60B8-333	BTS-33K	
R31	470kΩ	½	60B8-474	BTS-470K	Note 1
R32	1000Ω	½	60B8-102	BTS-1000	Note 2
R33	1000Ω	½	60B8-102	BTS-1000	
R34	470kΩ	½	60B8-474	BTS-470K	Note 1
R35	5600Ω	½	60B8-562	BTS-5600	
R36	1Meg	½	60B8-105	BTS-1Meg	
R37	680Ω	½	60B8-681	BTS-680	
R38	3900Ω	½	60B8-392	BTS-3900	
R39	100kΩ	½	60B8-104	BTS-100K	
R40	1500Ω	½	60B8-152	BTS-1500	
R41	5600Ω	2	60B20-562	BTB-5600	
R42	15kΩ	½	60B8-153	BTS-15K	
R43	270kΩ	½	60B8-274	BTS-270K	
R44	120kΩ	½	60B8-124	BTS-120K	Note 3
R45	470kΩ	½	60B8-474	BTS-470K	
R46	100Ω	½	60B8-101	BTS-100	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	NOTES
R47	330Ω	½	60B8-331	BTS-330	
R48	390Ω	½	60B8-391	BTS-390	
R49	47kΩ	½	60B8-473	BTS-47K	
R50	10kΩ	½	60B8-103	BTS-10K	
R51	10kΩ	½	60B8-103	BTS-10K	
R52	680Ω	½	60B8-681	BTS-680	
R53	47kΩ	½	60B8-473	BTA-47K	
R54	470kΩ	½	60B8-474	BTS-470K	
R55	1.6Meg	½	60B7-165	BTS-1.6Meg 5%	
R56	1.8Meg	½	60B7-185	BTS-1.8Meg 5%	
R57	150Ω	½	60B8-151	BTS-150	
R58	330Ω	½	60B20-331	BTB-330	
R59	3.3Meg	½	60B8-335	BTS-3.3Meg	
R60	150kΩ 5%	½	60B7-154	BTS-150K 5%	
R61	33kΩ	½	60B8-333	BTS-33K	
R62	3.3Meg	½	60B8-335	BTS-3.3Meg	
R63	1Meg	½	60B8-105	BTS-1Meg	
R64	2200Ω	½	60B8-222	BTS-2200	
R65	2200Ω	½	60B8-222	BTS-2200	
R66	2200Ω	½	60B8-222	BTS-2200	
R67	22kΩ	½	60B8-223	BTS-22K	
R68A	6200Ω	½	♦63C6-11	BTS-8200	
B	8200Ω	½		BTS-8200	
R69	1.2Meg	½	60B8-125	BTS-1.2Meg	
R70	1Meg	½	60B8-105	BTS-1Meg	
R71	10kΩ 5%	½	60B7-103	BTS-10K 5%	
R72	1Meg	½	60B8-105	BTS-1Meg	
R73	820Ω	½		BTS-820	
R74A	2700Ω	½	♦63C6-12	BTS-2700	
B	5000Ω	½		BTS-5000	
R75	560Ω	½	60B8-561	BTS-560	
R76	560Ω	½	60B8-561	BTS-560	
R77	100kΩ 5%	½	60B7-104	BTS-100K 5%	
R78	100kΩ 5%	½	60B7-104	BTS-100K 5%	
R79	4.7Meg	½	60B8-475	BTS-4.7Meg	
R80	47kΩ	2	60B20-473	BTB-47K	
R81	470kΩ	½	60B8-474	BTS-470K	
R82	5600Ω	½	60B8-562	BTS-5600	
R83	1500Ω	½	60B8-152	BTS-1500	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	NOTES
R84	160kΩ	½	60B8-164	BTS-150K	
R85	100kΩ	½	60B8-104	BTS-100K	
R86	5600Ω	½	60B8-562	BTS-5600	
R87	82Ω	½	60B28-21	BTS-82	
R88	470kΩ	½	60B8-474	BTS-470K	
R89	82Ω	½	60B28-21	BTS-82	

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	NOTES
R90	15kΩ	2	60B20-153	BTB-15K	Note 6
R91	3300Ω	2	60B20-332	BTB-3300	Note 7
R92	1000Ω	½	60B8-102	BTS-1000	
R93	3.3Ω	1	60B28-10		Note 8
R94	180kΩ	½	60B8-184	BTS-180K	Note 2
R95	470kΩ	½	60B14-474	BTA-470K	Note 9

Note 1. Chassis 20X5A, 20X5CZ and 20X5EZ (Run 10 or higher) may use a 1Meg resistor in this application.
Note 2. Not used in some versions.
Note 3. In chassis without a run stamp thru Run 4 use a 180kΩ resistor in this application
Note 4. In chassis without a run stamp thru Run 7 use a 27kΩ resistor in this application.
Note 5. In chassis without a run stamp thru Run 7 use a 2.7Meg resistor in this application.
Note 6. In chassis 20X5EZ without a run stamp thru Run 5 use a 18kΩ 2 watt resistor in this application.
Note 7. In chassis without a run stamp thru Run 3 use a 1.2kΩ, 1 watt resistor in this application.
Note 8. In chassis 20X5EZ without a run stamp thru Run 6 use a 4.7Ω resistor in this application.
Note 9. Some versions use a 270kΩ resistor in this application.
♦ Items R68A, R68B, C58A, C58B and C58C are combined in one unit.
† Items R74A, R74B, C56A and C56B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA ADMIRAL Part No.	Halldorson Part No.	Merit Part No.	RCA TYPE No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
T1	117VAC ⑨1.37A	580VCT .200ADC	5VAC ⑨ 3A	80C35-1	P9733	P-3077 ①	P-2838 ②	P-8154	28R33 ⑫	R-51BC ① ⑤
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC ⑨8.4A									

① Drill new mounting holes.
② Tape extra 5V winding, parallel and phase 6.3V windings for Sec. #3.
③ Tape 6.3V ⑨ 1.2A winding, parallel and phase 6.3V ⑨ 8A windings for Sec. #3.
④ Tape 6.3V ⑨ 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA ADMIRAL Part No.	Halldorson Part No.	Merit Part No.	RCA TYPE No.	Ram Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
T2	Vert. Osc. Trans.	79B18-4	B6702	A-3003	209T1①	V40S	A-8125	26A03	A-97X
T3	Horiz. Output Trans.	79C65-1					A-8254 ♦	P1Y-75 ♦	
T4	Vert. Output Trans.	79D43-4	Z1806	A-3039	V312		A-8141	25B34	A-109X ①
T5A	Yoke-Horiz. (69MH)	94C51-3 ①	DF605 ③④	MDF-13 ③ ④	232D1 ③④	Y70Y1843 ③ ⑤	DY-11A ⑤ ⑦	Y-10 ⑤ ⑦	Y-22-1 ⑤ ⑦
B	Vert. (37MH)	94A71-4 ⑥							

① Drill new mounting hole(s).
④ Connect as auto transformer.
⑥ Includes capacitor C67, resistors R75, R76, and R92.
⑦ Yoke rear cover and centering device.
⑤ Use original rear cover and centering device.
⑥ Connect horizontal yoke damping network across terminals #3 and #7. Use original horizontal network if necessary.
⑦ Remove capacitor from terminals #1 and #2. Use original horizontal yoke damping network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5				5	5		
4			4	4			
3			3	3			
2			2	2			
1			1	1			

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA ADMIRAL Part No.	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T6	4.8kΩ	3.2Ω	Part of Spkr.	Z1307	A-2830	A-3877	24E51	S-3X	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA ADMIRAL Part No.	QUAM Part No	NOTES
SP1	8"	PM	3.2Ω	78B98-1 ① ③	8A2I	① Used in Models C2356, C2306Z, C2307Z, C2306BZ and C2307BZ
	8"	PM	3.2Ω	78B79-1 ② ③	5A1	② Used in Models T1813B, T2212B and T2242BZ
						③ Includes output transformer and filter choke

COILS (RF-IF)

ITEM No.	USE	DC RES PRI	DC RES SEC	REPLACEMENT DATA ADMIRAL Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1A	Ant. Coil	0Ω CT	0Ω	94D46-52				Channel 2
B	Ant. Coil	0Ω CT	0Ω	94D46-53				Channel 3
C	Ant. Coil	0Ω CT	0Ω	94D46-54				Channel 4
D	Ant. Coil	0Ω CT	0Ω	94D46-55				Channel 5
E	Ant. Coil	0Ω CT	0Ω	94D46-56				Channel 6
F	Ant. Coil	0Ω CT	0Ω	94D46-57				Channel 7
G	Ant. Coil	0Ω CT	0Ω	94D46-58				Channel 8
H	Ant. Coil	0Ω CT	0Ω	94D46-59				Channel 9
I	Ant. Coil	0Ω CT	0Ω	94D46-60				Channel 10
J	Ant. Coil	0Ω CT	0Ω	94D46-61				Channel 11
K	Ant. Coil	0Ω CT	0Ω	94D46-62				Channel 12
L	Ant. Coil	0Ω CT	0Ω	94D46-63				Channel 13
L2	Fil. Choke	0Ω		88A45-12				
L3	Neut. Coil	0Ω		94C37-89				
L4A	RF, Mixer Grid & Osc. Coils	0Ω		94D46-72				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		94D46-73				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		94D46-74				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		94D46-75				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		94D46-76				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω		94D46-77				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		94D46-78				Channel 8
H	RF, Mixer Grid & Osc. Coils	0Ω		94D46-79				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		94D46-80				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		94D46-81				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		94D46-82				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		94D46-83				Channel 13
L5	Fil. Choke	0Ω		98A45-16				
L6	RF Coil	0Ω						
L7	1st. Video IF	.6Ω		94D46-89				
L8	27.5MC Trap	1Ω		72C96-23	20-1006		6171A *	
L9	Fil. Choke	0Ω		72A2-5	19-3001	TV-189	6178	.8 Microhenry
L10	2nd.Video IF	.3Ω	.8Ω	72D11-2	19-1062	TV-156	6250	
L11	3rd. Video IF	.4Ω	.4Ω	72C96-22	17-1063			
L12	4th. Video IF	.4Ω	.4Ω	72B107-1				
L13	Series Peaking Coil	5.3Ω		73A5-15	19-3180 ■	TV-184 ■	6180 ■	190 Microhenries, wound on 4.7KΩ resistor
L14	Shunt Peaking Coil	15Ω		73A5-7	19-3500		6174	500 Microhenries
L15	4.5MC Trap	4.6Ω		72B133-1	20-1005 ▲	TV-151 ▲	1470 ▲	
L16	Series Peaking Coil	7Ω		73A5-13	19-3300 ▲		4065 ▲	264 Microhenries, wound on 33KΩ resistor
L17	Shunt Peaking Coil	8Ω		73A5-9	19-1923 ▲		4648 ▲	370 Microhenries, wound on 10KΩ resistor
L18	Sound IF	4.6Ω		72B132-1	20-1005 ▲	TV-151 ▲	1470 ▲	
L19	Ratio Det.	3.9Ω	.30CT	72B68-4	17-1033		1668	Tertiary winding -.85Ω
L20	Horiz. Osc.	50Ω		94C17-3	19-1578	TV-163	6210	

* Enlarge mounting hole.
■ Parallel with 4.7KΩ resistor.
▲ Use leads as mounting support.
▲ Parallel with 33KΩ resistor.
♦ Parallel with 10KΩ resistor.

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 °L.I	REPLACEMENT DATA ADMIRAL Part No.	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
L21	.300ADC	65Ω	2.4 HY	Part of Spkr.	C3040 ①	C-2974	C-2327 ①	20C41 ①	C-21X

① Drill one new mounting hole.

FUSES

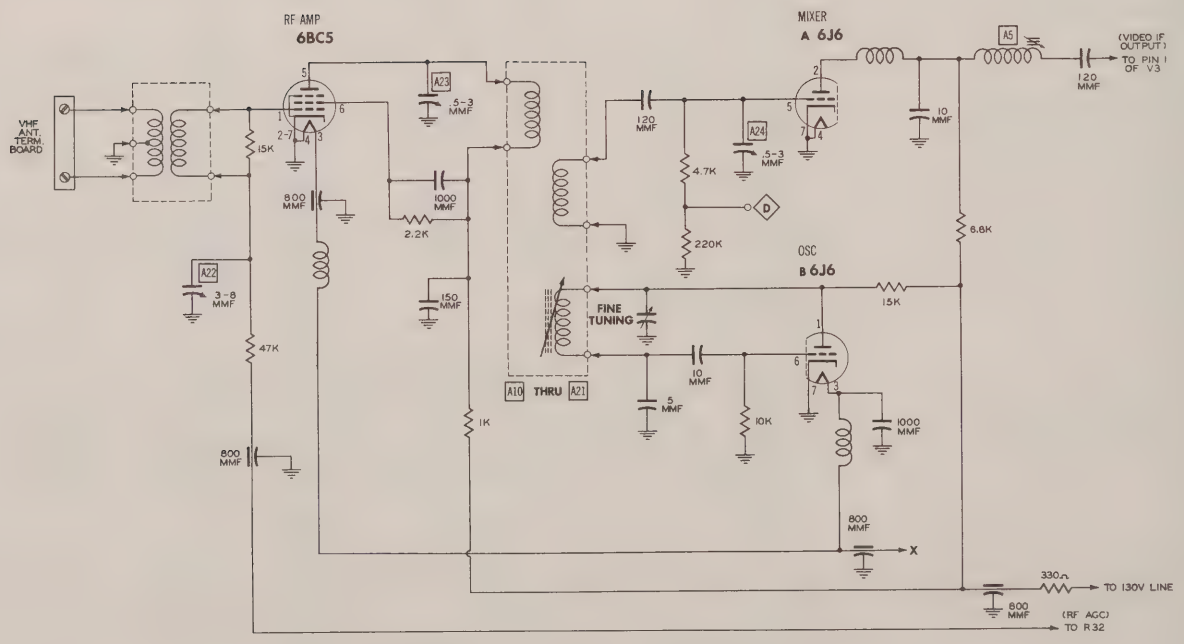
ITEM No.	TYPE	RATING	REPLACEMENT DATA ADMIRAL Part No. FUSE	ADMIRAL Part No. HOLDER	LITTELFUSE Part No. FUSE	LITTELFUSE Part No. HOLDER	BUSS Part No. FUSE	BUSS Part No. HOLDER
M1	SAG	3/8A 250V	84A4-3		342.375 (SAG-3/8A)	387001	AGX 3 8	4520

ADMIRAL CHASSIS
20XP5, A, 20X5A, CZ, EZ

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M2	Tuner	94D46-3	VHF - Chassis 20X5CZ, 20X5A, 20X5EZ
	Tuner	94D52-2	VHF - Chassis 20XP5, 20XP5A
M3	Printed Circuit Assembly	A4375B	Sound IF and Audio Output - Used in chassis 20X5A, 20X5CZ, 20X5EZ (stamped Run 9 thru R11
	Printed Circuit Assembly	A4375	Sound IF and Audio Output - Used in chassis 20X5A, 20X5CZ, 20X5EZ without a run stamp thru chassis stamped Run 8.
	Printed Circuit Assembly	A4425	Sound IF and Audio Output - Used in chassis 20XP5A without a run stamp thru chassis stamped Run 8.
M4	Centering Device	94A71-1	
M5	Ion Trap	94A15-4	
B2	Trimmer Cap.	66A30-3	Horiz. Drive (170-780MMF)
	Cabinet	34E61-5	Model T1812B
	Cabinet	34E57-2	Model T2212B
	Cabinet	34E71-8	Model T2242BZ
	Cabinet	35E301-2	Model C2256
	Cabinet	35E317-2	Model C2306Z
	Cabinet	35E317-3	Model C2307Z
	Cabinet	35E317-8	Model C2306BZ
	Cabinet	35E317-9	Model C2307BZ
	Knob	33B81-8	Brightness, Horiz.Vert. Hold. -Models C2256, C2306Z, C2307Z
	Knob	33D136-2	Channel Selector - Models T1812B, T2212B, C2256, C2306Z, C2307Z
	Knob	33D136-10	Channel Selector - Models T2242BZ, C2306BZ, C2307BZ
	Knob	33D107-53	Contrast - Models T1812B, T2212B, C2256, C2307Z
	Knob	33D107-56	Contrast - Models T2242BZ, C2306BZ, C2307BZ
	Knob	33D107-55	Fine tuning - Models T1812B, T2212B, C2256, C2306Z, C2307Z
	Knob	33D107-58	Fine tuning - Models T2242BZ, C2306BZ, C2307BZ
	Knob	33D136-3	On-off-volume - Models T1812B, T2212B, C2256, C2306Z, C2307Z
	Knob	33D136-11	On-off-volume - Models T2242BZ, C2306BZ, C2307BZ
	Safety Glass	21B65-1	Model T1812B
	Safety Glass	21B65-2	Model T2212B
	Safety Glass	21B65-6	Model T2242BZ
	Safety Glass	21B62-7	Model C2256
	Safety Glass	21B62-10	Models C2306Z, C2307Z, C2306BZ, C2307BZ
	Mask	23D195-1	Model C2256
	Mask	23D196-1	Models C2306Z, C2307Z, C2306BZ, C2307BZ



VHF TUNER 94D52-2 USED WITH CHASSIS 20XP5 AND 20XP5A

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE TUNER SCHEMATIC

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TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V15, V16, V17 and V18. Check fuse, M1. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C66, C65 R90 and other associated components.	Check L20, C62, C63, C64, R82, R84, R85 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17 and V19. Check R85, R90, T3, T5A and other associated components.

BLOOMING

Check by substitution V16, V17, V18 and V19. Check R90, R94, T3 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V11. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PRODUCTION CHANGES

	Admiral production changes are coded Run 1, Run 2, Run 3, ete.. Early production of chassis covered in this Photofact Folder were not stamped with a run number. The first production change in this series of chassis was designated Run 4.
Ch. 20XP5, A 20X5A, 20X5CZ, 20X5EZ, (Run 4)	TO PREVENT CAPACITOR C4 BREAKDOWN R91 is increased from 1.2KΩ, 1 watt to 3.3KΩ, 2 watts to reduce the voltage applied to C4.
Ch. 20XP5, A, 20X5A, 20X5CZ, 20X5EZ (Run 5)	TO DECREASE WIDTH AND INCREASE BRIGHTNESS CONTROL RANGE C68 is omitted to decrease the load across the horizontal windings of the deflection yoke. R44 is decreased from 180KΩ to 120KΩ.
Ch. 20X5EZ (Run 6)	TO INCREASE WIDTH C68 is added in the circuit as shown on the schematic.
Ch. 20X5EZ (Run 7)	TO INCREASE WIDTH C68 is omitted. R90 is decreased from 18KΩ to 15KΩ. R93 is decreased from 4.7Ω to 3.3Ω.
Ch. 20XP5, A, 20X5, 20X5CZ, 20X5EZ, (Run 8)	TO IMPROVE HORIZONTAL SYNC R61 is increased from 27KΩ to 39KΩ. R62 is increased from 2.7Meg to 3.3Meg.
Ch. 20X5A, 20X5CZ, 20X5EZ, (Run 9)	TO IMPROVE VOLTAGE REGULATION The audio output stage is modified in Run 9 to make this stage act as a voltage regulator. Previous to Run 9 all chassis without a run stamp thru Run 8 used the circuit shown on pages 12 and 21.
Ch. 20X5A, 20X5CZ, 20X5EZ. (Run 9 & higher)	TO IMPROVE NOISE IMMUNITY IN FRINGE AREAS In chassis stamped Run 9 and higher the following changes were made in the AGC circuit. Previous to Run 9 all chassis without a run stamp thru Run 8 used the circuit shown on pages 12 and 21. C1D is decreased from 20MFD to 10MFD. C1A is increased from 40MFD to 60MFD. C3 is decreased from 80MFD to 40MFD. C32 is decreased from 27MMF to 18MMF. C33 is decreased from .47MFD to .22MFD. C34 and C35 are added. R52 is increased from 330Ω to 680Ω. R53 is increased from 27KΩ to 47KΩ. R55 is increased from 1Meg to 1.6Meg. R56 is increased from 1000Ω to 1.8Meg. R38 is increased from 1000Ω to 3.9KΩ. R58 is added. R30 is decreased from 2.2Meg to 33KΩ R1 is increased from 1000Ω to 3000Ω. R39 is decreased from 2.2Meg to 100KΩ. R34 is increased from 56KΩ to 470KΩ. R23 is added.
Ch. 20X5A, 20X5CZ, 20X5EZ (Run 10)	TO PROVIDE FASTER AGC ACTION R31 is decreased from 1Meg to 470KΩ. R35 is decreased from 1Meg to 470KΩ.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one a time, thru the small hole in the cabinet to the right of the channel selector shaft.

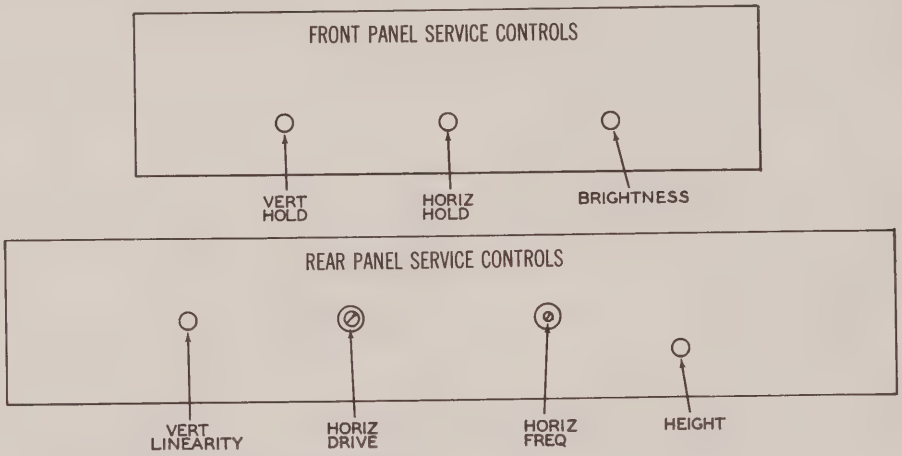
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 4 wood screws holding wood strip at the top of the safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-range position and adjust the horizontal frequency coil slug (L20) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L19). Adjustment is accessible from top of chassis. (For location see Tube Placement Chart).

FUSES

One fuse is used for horizontal and vertical sweep protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 11 wood screws and 2 metal screws. Remove rear cover.
3. Disconnect speaker plug.
4. Remove 4 chassis bolts. Remove chassis.
5. Remove 2 speaker nuts. Remove speaker.

NOTE: If it is necessary to remove the chassis for servicing, it is also necessary to remove the speaker. The filter choke and audio output transformer of this receiver is mounted on the speaker and must be connected to the receiver for proper operation.

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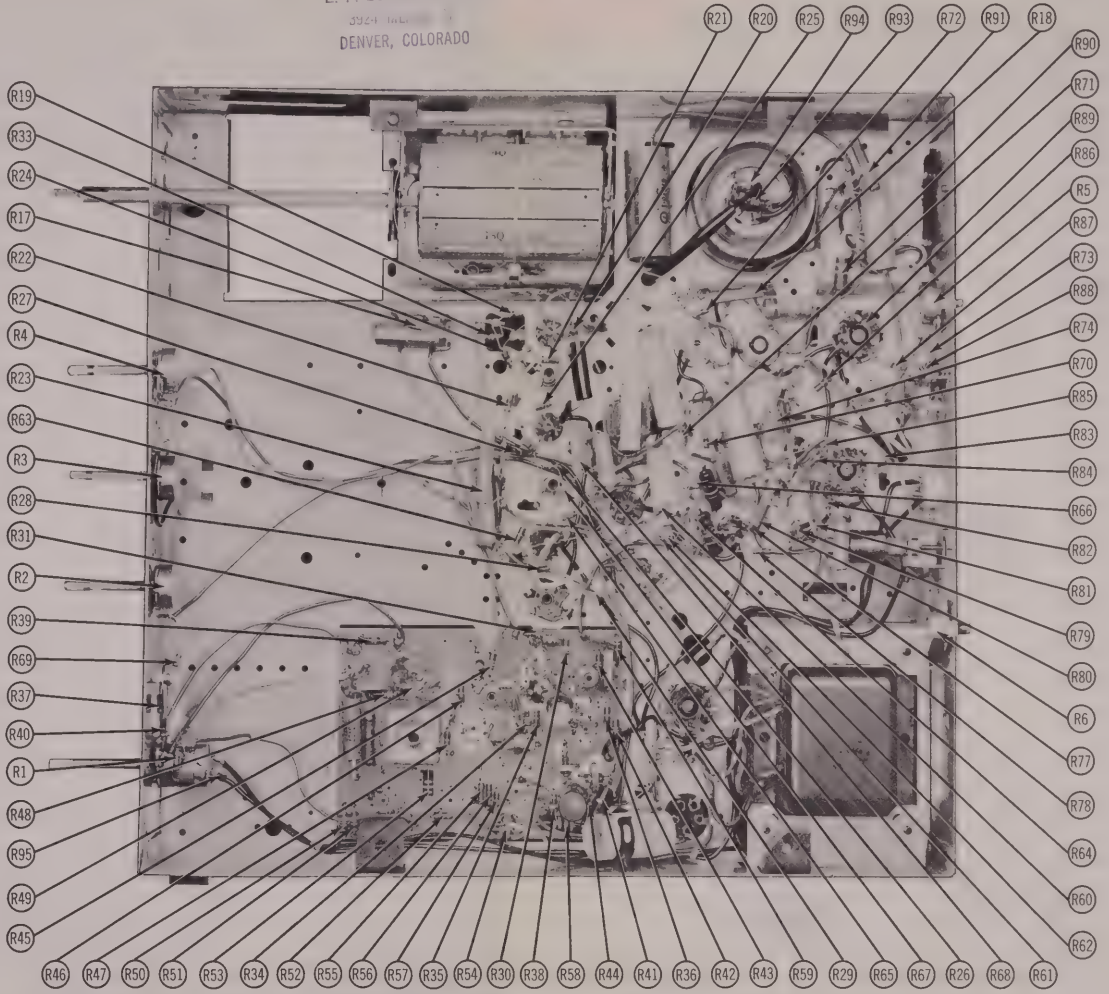

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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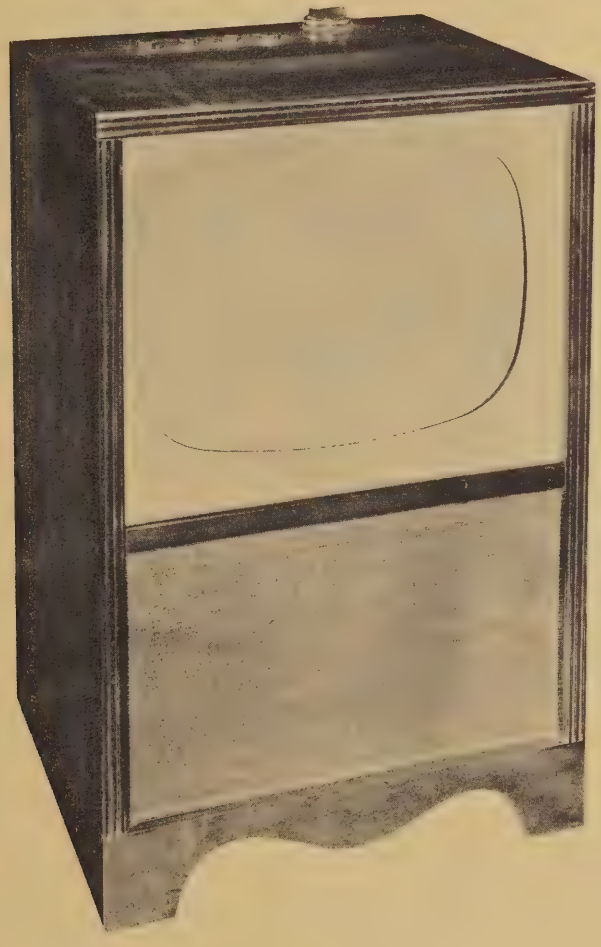
Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 54CM21

AMC MODELS
54CL021, 54CM21, 54TW21

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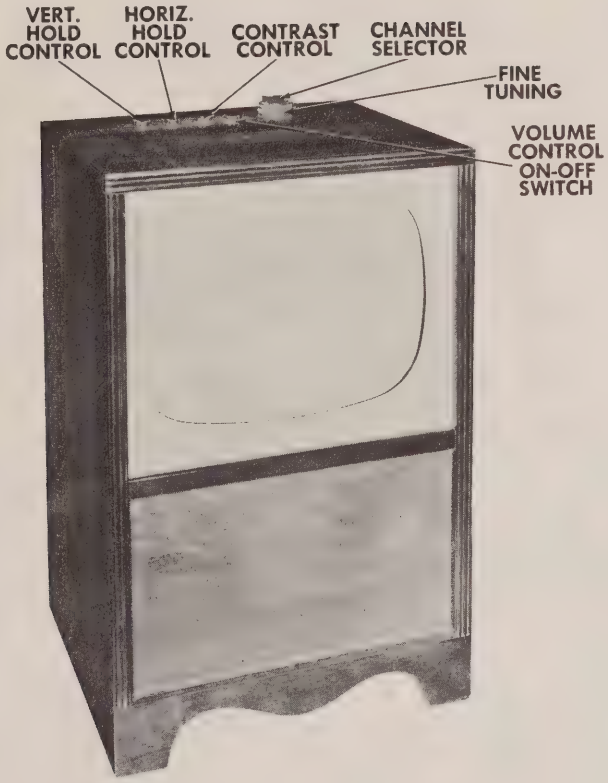

DENVER, COLORADO

AMC MODELS
54CLO21, 54CM21, 54TW21

AMC MODEL 54CM21

TRADE NAME	AMC Models 54CLO21, 54CM21, 54TW21
SUPPLIER	Associated Merchandising Corp., 1440 Broadway, New York 14, N.Y.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.44 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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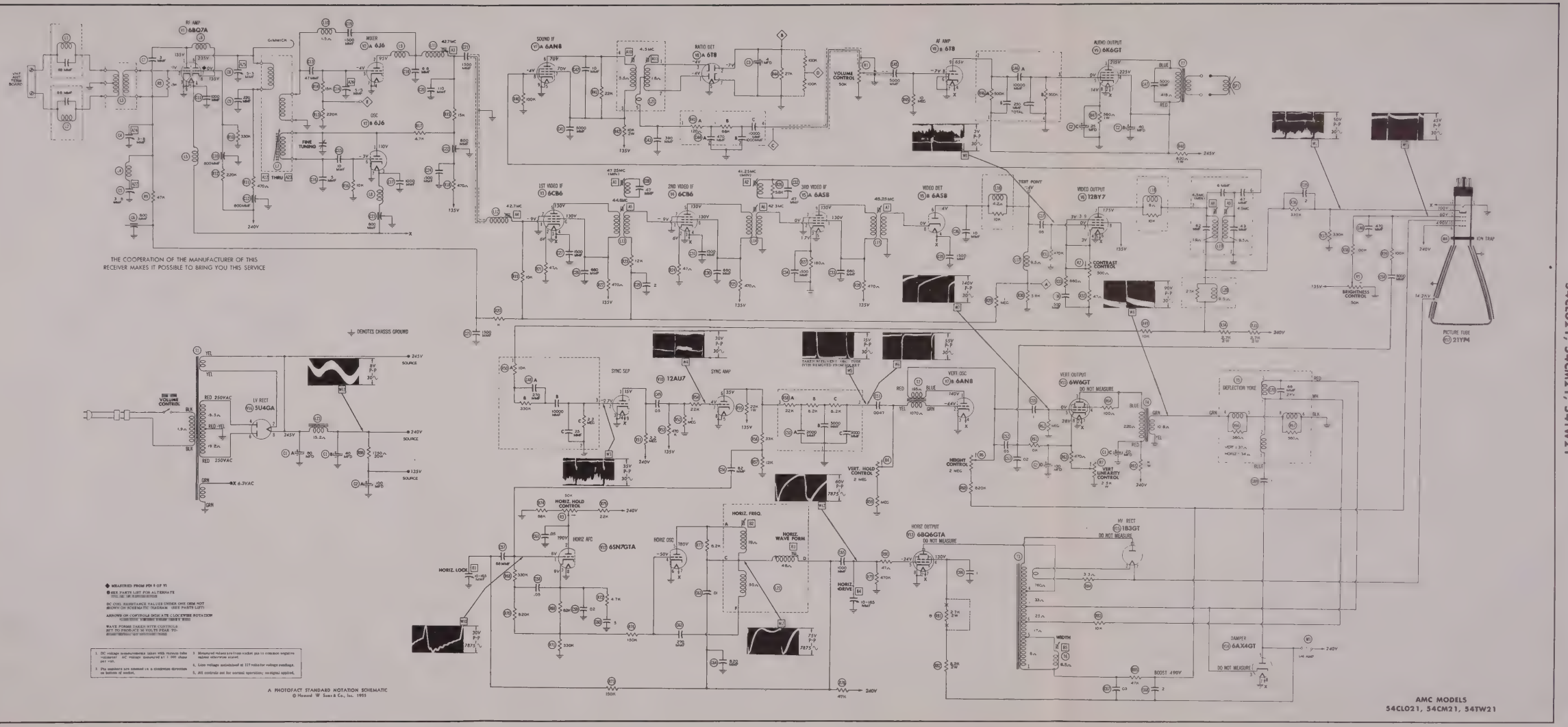
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
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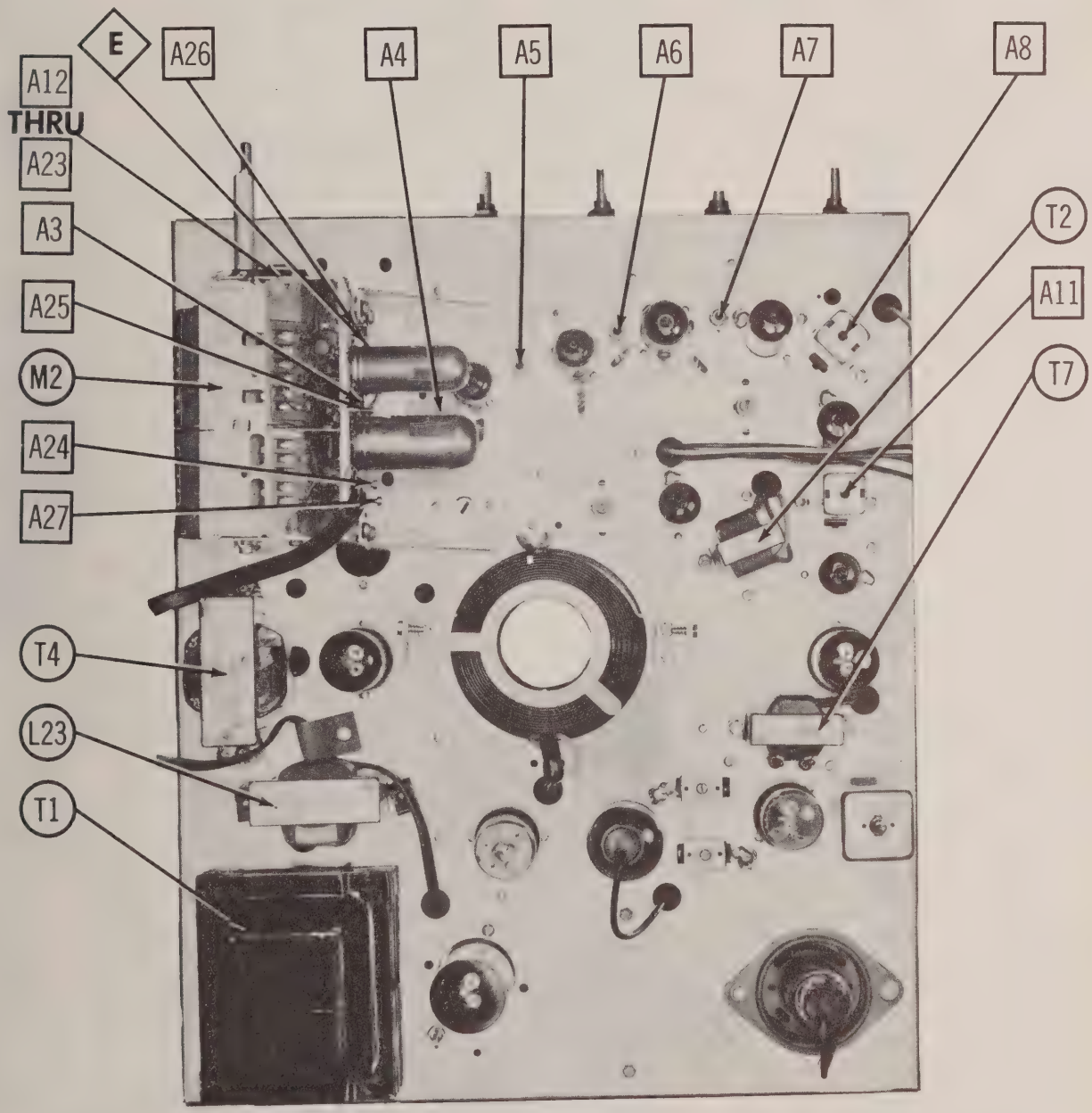

CHASSIS TOP VIEW

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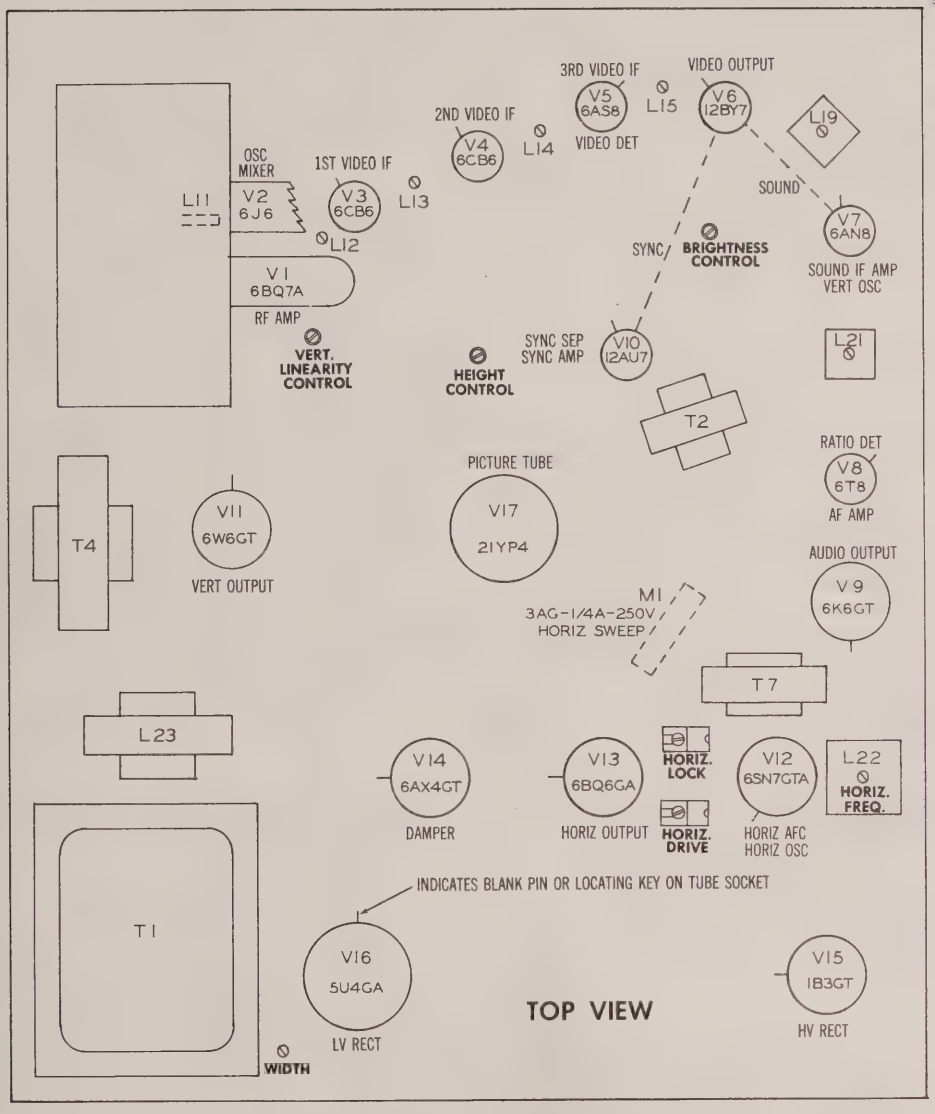
AMC MODELS
54CL021, 54CM21, 54TM21

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V16**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V17**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V17, Fuse (M1)**
No vertical deflection - **V7, V11**
Poor vert. linearity or foldover - **V7, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, V16**
Vert. off freq. - **V7, V10**
Horiz. off freq. - **V10, V12**

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator to eliminate the high voltage shock hazard.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	47.25MC (Unmod)	Any	DC probe to point (A). Common to chassis.	A21	Adjust for MINIMUM deflection.
2.	"	"	41.25MC	"	"	A2	"
3.	"	"	42.7MC	"	"	A3, A4	Attenuate generator output to maintain not more than 1.5 volts at VTVM. Adjust for maximum deflection.
4.	"	"	44.6MC	"	"	A5	"
5.	"	"	42.3MC	"	"	A6	"
6.	"	"	45.25MC	"	"	A7	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	43.5MC (10MC Swp)	41.25MC 42.35MC 45.75MC 47.25MC	Any	Vert. Amp. to point (A). Low side to chassis.		Check for response similar to Fig. 1. Adjust A3 thru A7 for desired response. A7 adjusts tilt, A3 and A4 adjusts band width, A6 places 42.35MC marker, and A5 places 45.75MC marker. A1 and A2 traps should not require retouching.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to pin 2 (grid) of 12BY7 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig. 2) to pin 11 (cathode) of picture tube. Common to chassis.	A8	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to pin 2 (grid) of 12BY7 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A9, A10	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C). Common to point (D).	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 2 (grid) of 12BY7 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A9, A10	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A11	Reconnect stabilizing capacitor C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

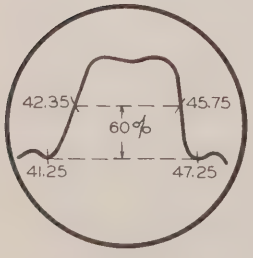

FIG. 1

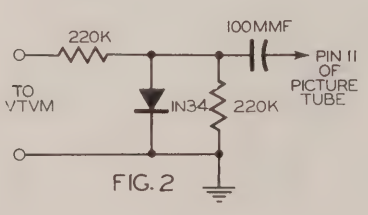

FIG. 2

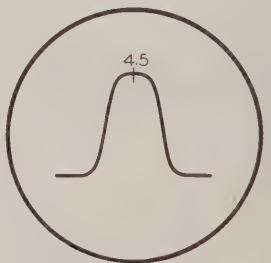

FIG. 3

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ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustments are reached thru a hole just to the right of the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Use only enough sweep generator output to provide usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (A). Low side to chassis.	A12	Video marker should be at 60% on response curve. Place sound marker as shown in Fig. 5.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

RF AND MIXER ALIGNMENT

Use only enough sweep generator output to provide usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. to point (E). Low side to chassis.	A24, A25, A26	Adjust for response similar to Fig. 6 with markers above 90%.
13.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 6. If markers fall below 70% on any channel, make slight compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

IF TRAP ALIGNMENT

The IF trap is for the purpose of reducing interference on Channel 2 from transmitters operating in the 40MC band. If such interference is noted on Channel 2, adjust A27 for minimum interference. If no interference is noted, adjust A27 to maximum clockwise position.

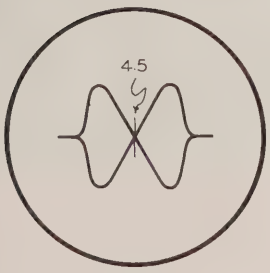


FIG. 4

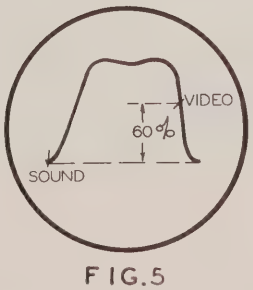


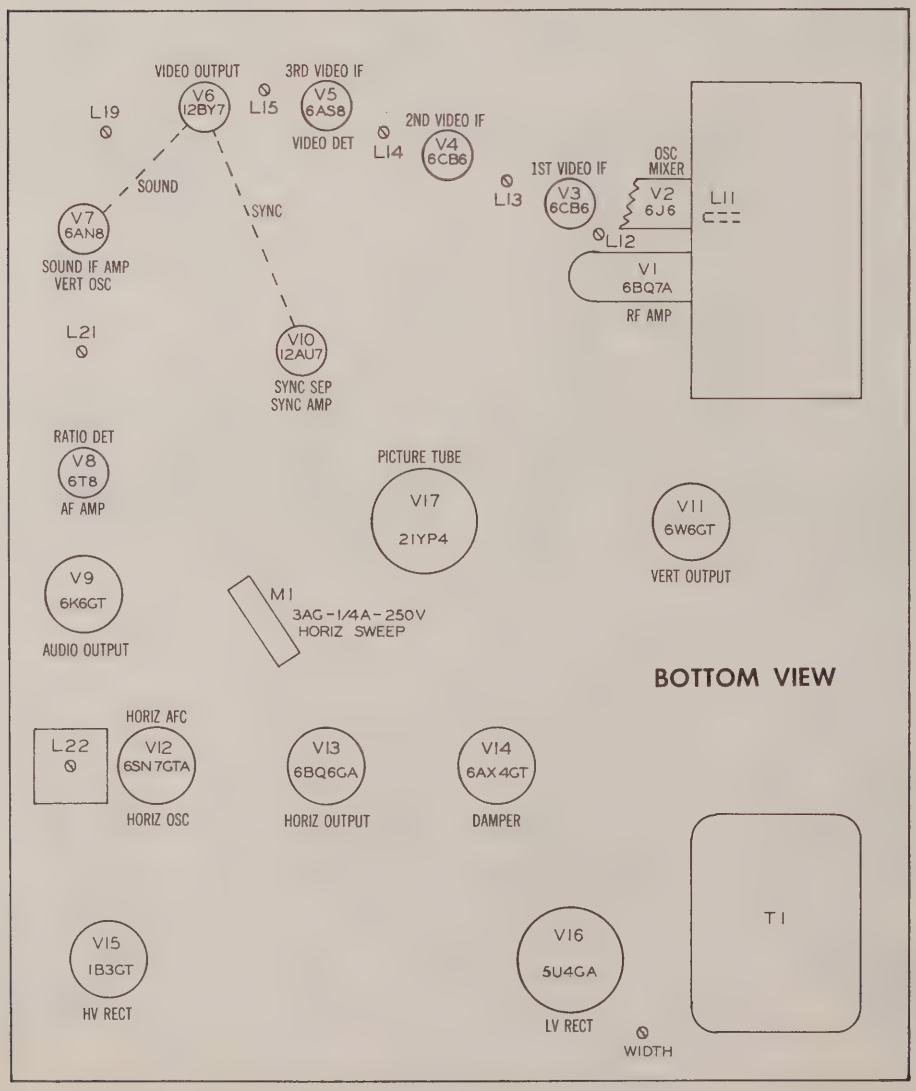
FIG. 5

FIG. 6

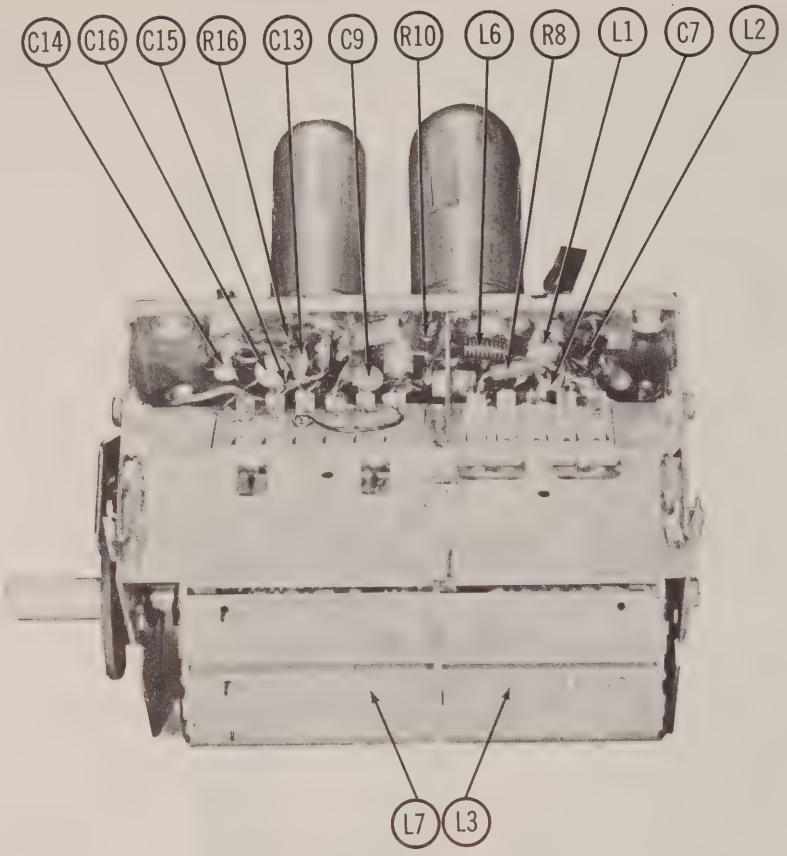
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1Meg	0Ω	.1Ω	0Ω	†500Ω	140KΩ	INF	0Ω
V 2	6J6	†6.8KΩ	†17KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	†2.3KΩ	†2.3KΩ	0Ω		
V 4	6CB6	1Meg	47Ω	0Ω	.1Ω	†2.3KΩ	†2.3KΩ	0Ω		
V 5	6AS8	†2.3KΩ	.1Ω	180Ω	.1Ω	0Ω	5.6KΩ	0Ω	.1Ω	†2.3KΩ
V 6	12BY7	200Ω	470KΩ	200Ω	0Ω	0Ω	.1Ω	†5.4KΩ	†1.8KΩ	200Ω
V 7	6AN8	▲2.2Meg	2Meg	0Ω	.1Ω	0Ω	†12KΩ	†12KΩ	100KΩ	0Ω
V 8	6T8	INF	27KΩ	INF	.1Ω	0Ω	0Ω	0Ω	10Meg	†500KΩ
V 9	6K6GT	NC	0Ω	†1.2KΩ	†900Ω	500KΩ	NC	.1Ω	560Ω	
V 10	12AU7	†2.2Meg	2.2Meg	0Ω	0Ω	0Ω	†18KΩ	400KΩ	0Ω	.1Ω
V 11	6W6GT	TP	0Ω	†1.2KΩ	†1.3KΩ	1Meg	NC	.1Ω	1.1KΩ	
V 12	6SN7GTA	1.5Meg	†25KΩ	400KΩ	500KΩ	†47KΩ	0Ω	.1Ω	0Ω	
V 13	6BQ6GTA	TP	0Ω	NC	†11KΩ	470KΩ	TP	.1Ω	0Ω	TOP CAP ▲33Ω
V 14	6AX4GT	NC	NC	INF	NC	†15Ω	NC	0Ω	.1Ω	
V 15	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲795Ω
V 16	5U4GA	NC	20KΩ	NC	19Ω	NC	18.5Ω	NC	20KΩ	
V 17	21YP4	0Ω	†130KΩ	PIN 6 †15Ω	PIN 10 47KΩ	PIN 11 †180KΩ	PIN 12 .1Ω			

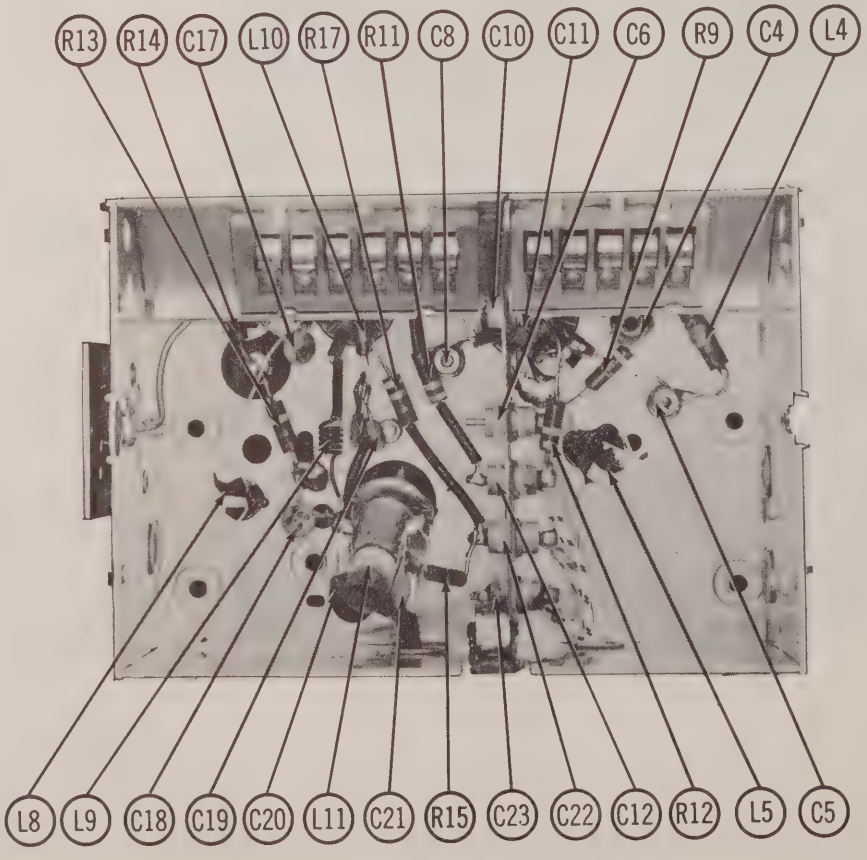
† MEASURED FROM PIN 8 OF V16.
▲ MEASURED FROM PIN 3 OF V14.
TP - TIE POINT
NC - NO CONNECTION



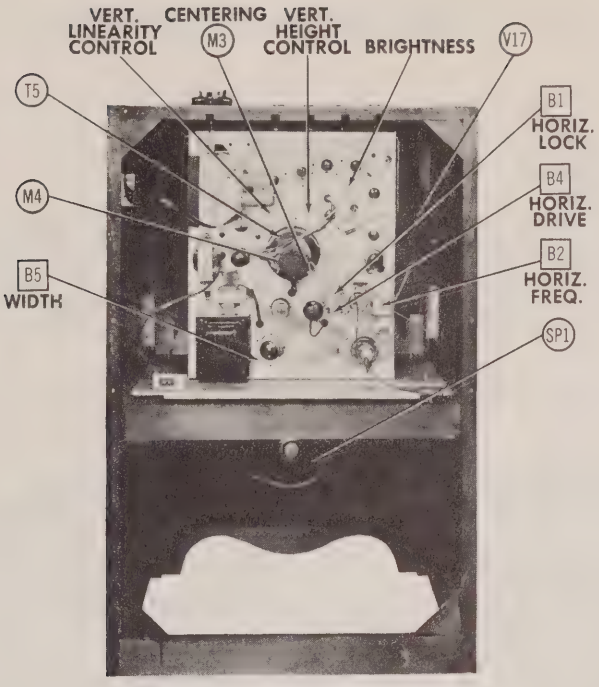
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

PROPERTY OF
L. F. DUNKELSHIP

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to the center of its range.

Adjust the horizontal lock trimmer (B1) until picture synchronizes horizontally.

If unable to obtain proper horizontal sync by adjusting B1, continue with alignment of the horizontal oscillator coil (L22) as follows:

1. Set the horizontal frequency slug (B2) and the waveform slug (B3) at their maximum counter clockwise position.
2. Short together terminals "C" and "D" of the horizontal oscillator coil (L22).
3. Set the horizontal hold control to the center of its range.
4. Adjust B2 clockwise until picture just locks in horizontally.
5. Remove short from terminals "C" and "D" of L22. If picture loses sync with short removed, adjust B3 clockwise until picture falls into sync.
6. Connect the vertical input lead of an oscilloscope thru 100KΩ to terminal "C" of L22. Adjust the waveform slug (B3) clockwise until the broad and narrow peaks are of equal amplitude as shown in Fig. 7. While adjusting B3 keep the picture in sync by tuning the horizontal hold control. Disconnect scope from receiver.
7. Set the horizontal hold control fully clockwise and adjust the horizontal lock trimmer (B1) until the picture starts to fall out of horizontal sync.
8. The horizontal holding action should be as follows:
   a. With horizontal hold fully counter clockwise the picture may lose sync when switching off channel and back again.
   b. With the horizontal hold fully clockwise switch off channel and back. The picture should be out of sync or just pulling out of sync.
   c. With horizontal hold control at mid-position the picture should fall in sync when switching off channel and back again.

Adjust the horizontal drive trimmer (B4) counter clockwise until a white vertical ine appears on the left side of the screen. Then adjust B4 clockwise until the white vertical line disappears.

Adjust the horizontal width coil (B5) for a picture slightly wider than necessary to fill the picture mask horizontally.

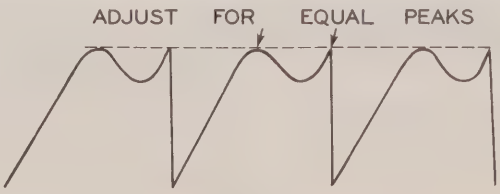


FIG. 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V13, V14 and V16. Check adjustments B4 and B5. Check C65, R81, R82, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V13 and V14. Check adjustment B4. Check C65, R81, R82 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V13 and V14. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines ".

PIE CRUST EFFECT

Check by substitution V12, V13 and V14. Check C58, C59 for open. Check L22, R72, R74 and other associated components.

XMAS TREE EFFECT

Check by substitution V12, V13 and V14. Check T3 and T5 for internal arcing. Check L22, C56, C62, C57, R75, R78 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V11. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, C1C, C2D, R65, R63 and other associated components.	Check T2, R59, R60, R6, C51, C55 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V11. Check height and vertical linearity controls for proper operation. Check R60, T4 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V7 and V11. Check R60, R6, T2, C55 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V11. Check C2D, R7, R63, T4 and other associated components.

FOLDS

Check by substitution V7 and V11. Check C52, C53, C55, R61, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V10. Check C48, C49, R51, R53, R55 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check vertical integrator network. Check T2, R59, R4, C51, and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V12. Check C56, C58, C62, C63, R75, R72 and other associated components.

HORIZONTAL BENDING

Check by substitution V10 and V12. Check components associated with V12.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C37, C39, R32, R34, R35 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A8. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check L16, L18, L20, C37, C39, R36 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check C37, C39, R36 and other associated components.

SMEAR

Substitute V6 . Check L16, L17, L18, L20, C37, C39, R36 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stages V8 and V9 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C44, C45, C46, C47, C2B, R46, R47, R48, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A11 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V16. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V16. Check B+ filter and decoupling network.

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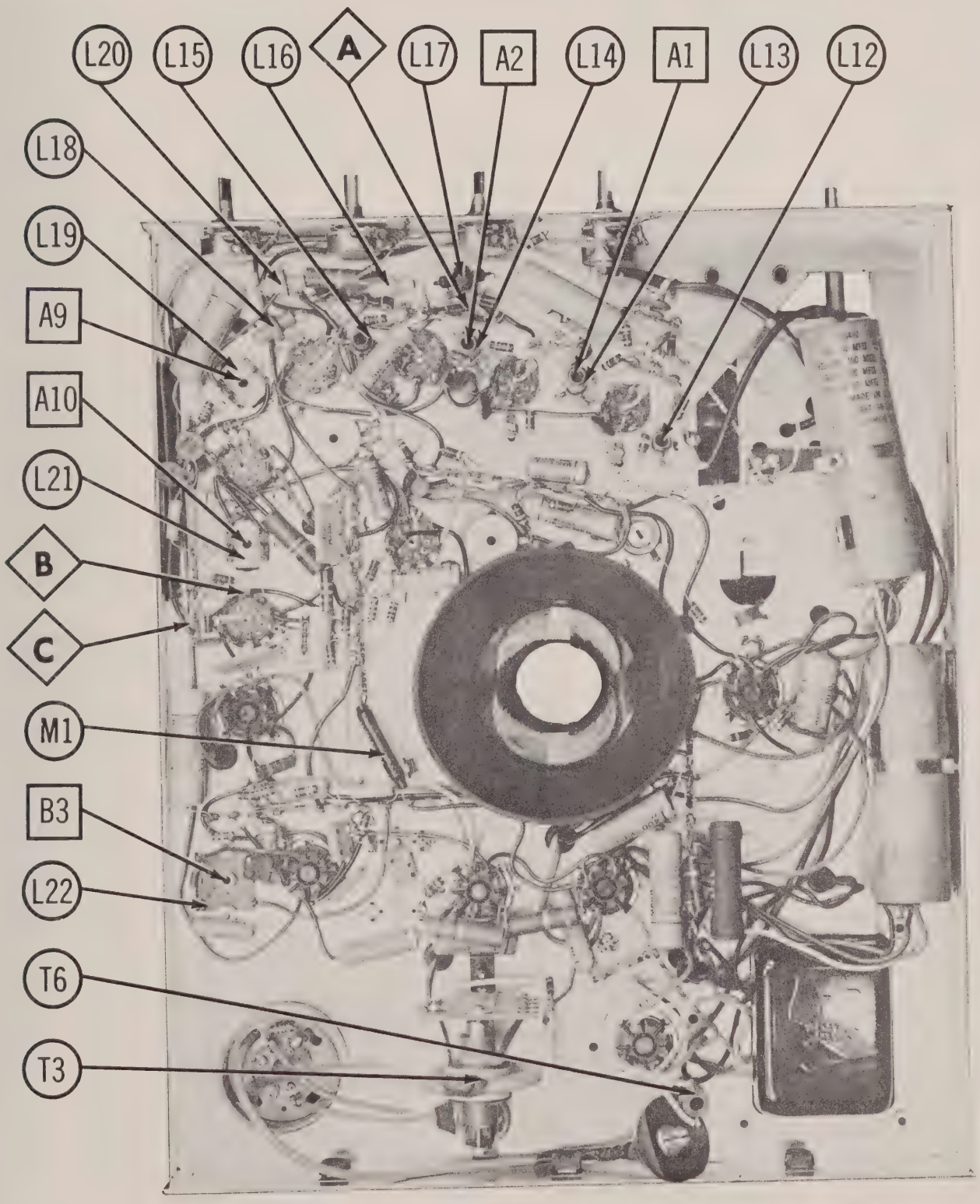
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AMC PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp	6BQ7A	6JQ7A	9AJ	
V2	Osc.-Mixer	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.				
	Video Det.	6AS8	6AS8	9DS	
V6	Video Output	13BY7	13BY7	9BF	
V7	Sound IF Amp.- Vert. Osc.	6AN8	6AN8	9DA	
V8	Horiz Det.- AF Amp.	6T8	6T8	9E	
V9	Audio Output	6K8GT	6K8GT	7H	
V10	Sync Separator- Sync Amp.	12AU7	12AU7	8A	
V11	Vert. Output	6W8GT	6W8GT	7H	
V12	Horiz. AFC- Horiz. Osc.	6BN7GTA	6BN7GTA	8BD	
V13	Horiz. Output	6BQ6GTA	6BQ6GTA	8AM	
V14	Damper	6AX4GT	6AX4GT	4CG	
V15	HV Rectifier	1B3GT	1B3GT	2C	
V16	LV Rectifier	5U4GA	5U4GA	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: AMC PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V17	21YP4	21YP4	21YP4	21YP4	21YP4	12L	Aluminized
		21YP4A ①	21YP4A ①	21YP4A ③	21YP4A ①	12L	Silver screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: AMC PART No.	CENTRALAB PART No.	ERIE PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	NOTES
C1A	80	350	18-379			FP378	TM-804020-650	T-180	
B	40	350							
C	20	350							
C2A	100	350	18-380						Q-187
B	40	350							MT-0825
C	25	25							
D	100	50							
C3	4	50	18-292			TC30	TD-4-50	MMT-0505	
C4	5-8			828-10					
C5	3-8			828-10					
C6	800								
C7	9			TCZ-3R3	NP0A-3R3	ZT-5533			
C8	5.3			830-3	3135-01-0R5	CT585A			
C9	220			DD-221	811-221	UC-5323			
C10	800								
C11	1000			DD-102	801-001	DC-521			
C12	800								
C13	47			DD-470	831-470	UC-5447			
C14	5.3			829-3	3135-01-0R5	CT585A			
C15	10			TCZ-40	NP0K-100	ZT-541			
C16	5								
C17	1000			DD-102	801-001	DC-521			
C18	6.8			TCZ-6R8	NP0A-6R8	ZT-5568			
C19	1500			DD-152	801-0015	DC-5215			
C20	110			TCN-110	N750L-11				
C21	1500			DD-152	801-0015	DC-5215			
C22	800								
C23	800								
C24	1500		15-198	DD-152	801-0015	DC-5215		C-1215	
C25	1500		15-198	DD-152	801-0015	DC-5215		C-1215	
C26	680		15-221	DD-681	811-681	UC-5368		K-1368	
C27	1500		15-198	DD-152	801-0015	DC-5215		C-1215	
C28	47			TCZ-47	NP0-338-470	ZT-5447	IMP4-P22	KR-1447	
C29	.2	400	16-185			PT4032		3304032	
C30	680		15-221	DD-681	811-681	UC-5368		K-1368	
C31	1500		15-198	DD-152	801-0015	DC-5215		C-1215	
C32	47			TCZ-47	NP0-338-470	ZT-5447		KR-1447	
C33	680		15-221	DD-681	811-681	UC-5368		K-1368	
C34	1500		15-198	DD-152	801-0015	DC-5215		C-1215	
C35	1500		15-198	DD-152	801-0015	DC-5215		C-1215	
C36	10		15-223						
C37	.05	400	16-189	DF-503		PT415	IMP4-S5	330415	
C38	1500		15-198	DD-152	DO-152	DC-5215		C-1215	
C39	.2	400	16-185			PT4032	IMP4-P22	3304032	
C40	470		15-199	DD-471	831-471	UC-5347		K-1347	
C41	5000		15-197	DD-503	811-005	DC-535		C-1250	
C42	10								
C43	390	500	15-231	DS-391	GP2K-391	MC343		K-1339	
C44A	470			DD-471	831-471	UC-5347		K-1347	
B	1000		† 33-101	DD-102	801-001	DC-531		K-1310	
C	10000			DD-103	811-01	DC-53		330411	
C45	5000		15-197	DD-503	811-005	DC-535	IMP8-D5	C-1250	
C46A	1000								
B	250		# 33-103	#PC-80	#1404-01				
C	5								
C47	5000		15-197	DD-502	811-005	DC-525	IMP8-D5	C-1250	
C48A	270				(GP2K-271	UC-5327		K-1327	
B	10000		*38-103	*PC-380	811-01	DC-53		330411	
C	25				(GP1K-250	UC-5425		K-1425	
C49	.05	400	16-189	DF-503		PT415	IMP4-S5	330415	
C50A	3000					PT832	IMP8-D2	C-1230	
B	5000		*33-100	*PC-100	#1405-01	PT825	IMP8-D5	C-1250	
C	5000					PT835	IMP8-D5	C-1250	
C51	.0047	400	16-210	DS-472	GP2-333-472	PT5347	IMP8-D47	3305347	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: AMC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C52	05	600	16-193	DF-503		PT415	IMP6-S5	330615	
C53	02	400	16-205	DF-203	811-02	PT412	IMP4-S2	330412	
C54	5000		15-197	DD-502	811-005	DC-525	IMP8-D5	C-1250	
C55	.1	600	16-208	DF-104		PT604	IMP6-P1	330601	
C56	82	500	15-204	TCZ-82	NP0-337-820			KR-1482	
C57	68	500	15-205	TCZ-68	NP0-337-680	ZT-5468		KR-1468	
C58	.05	400	16-189	DF-503		PT415	IMP4-S5	330415	
C59	.03	400	16-305	DF-303	811-03	PT413	IMP4-S3	330413	
C60	.5	200	16-184			PT505	IMP2-P5	330505	
C61	.05	400	16-189	DF-503		PT415	IMP4-S5	330415	
C62	270	500	15-225	TCZ-270	NP0 335-271			KR-1327	
C63	01	400	16-203	D6-103	GP2-333-103	PT411	IMP4-S1	3304.1	
C64	820	500	15-206					KR-1382	
C65	1000	500	15-207	D8-102	GP3L-102	MC858	IMP6-D1	K-1210	
C66	.1	400	16-207	DF-104		PT601	IMP4-P1	330401	
C67	.03	600	16-213	DF-303		PT613	IMP6-S3	330613	
C68	.2	400	16-185			PT4032	IMP4-P22	3304032	
C69	.1	400	16-207	DF-104		PT401	IMP4-P1	330401	
C70	68	2000		DCM0-680	81CV-680	DC30468			

† Items C44A, C44B, C44C, R43A and R43B are combined in one unit.
‡ Items C48A, C48B, C48C, R46A and R46B are combined in one unit.
When replacing items separately C45B and C46C should total 250MMF.
* Items C48A, C48B, C48C, R50A, R50B and R50C are combined in one unit.
# Items C50A, C50B, C50C, R58A, R58B and R58C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: AMC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	35-27	QI1-133	A47-500K-Z	B 60 S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWS-12	Not Req.	UB-26	Attach to R1A
R2A	500Ω	½	35-28	QII-103	A47-500-B	B-4	U-3	Contrast
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	50KΩ	½	35-30	QII-123	A47-50K-S	B 31	U-35	Horiz Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	2Meg	½	35-29	QII-239	A47-2Meg-S	B 75	U-56	Vert. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	50KΩ	½	35-26	QII-123	A47-50K-S	B2 31	SU-35	Brightness
B	Shaft		Not Req.	RQ	FSH-1/4	Not Req.	Not Req.	Attach to R5A
R6A	2Meg	½	35-25	QII-239	A47-2Meg-S	BX-76	SU-56	Height
B	Shaft		Not Req.	RQ	FSH-1/4	Not Req.	Not Req.	Attach to R6A
R7	2500Ω	1	35-34		39-3000			Vert. Linearity - wire-wound

RESISTORS

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: AMC PART No.	IRC PART No.	NOTES
R8	15KΩ	½		BTS-15K	
R9	47KΩ	½		BTS-47K	
R10	330KΩ	½		BTS-330K	
R11	470Ω	½		BTS-470	
R12	220KΩ	½		BTS-220K	
R13	220KΩ	½		BTS-220K	
R14	15KΩ	½		BTS-15K	
R15	15KΩ	½		BTS-15K	
R16	10KΩ	½		BTS-10K	
R17	4700Ω	½		BTS-4700	
R18	470Ω	½	60-597	BTS-470	
R19	10KΩ	½	60-760	BTS-10K	
R20	1000Ω	½	60-873	BTS-1000	
R21	47Ω	½	60-698	BTS-47	
R22	470Ω	½	60-597	BTS-470	
R23	12KΩ	½	60-611	BTS-12K	
R24	47Ω	½	60-698	BTS-47	
R25	470Ω	½	60-597	BTS-470	
R26	5600Ω	½	60-874	BTS-5600	
R27	180Ω	½	60-768	BTS-180	
R28	470Ω	½	60-597	BTS-470	
R29	1Meg	½	60-879	BTS-1Meg	
R30	5600Ω	½	60-874	BTS-5600	
R31	470KΩ	½	60-864	BTS-470K	
R32	47Ω	½	60-698	BTS-47	
R33	680Ω	2	60-708	BTS-680	
R34	2700Ω	2	60-816	BTB-2700	
R35	2700Ω	2	60-815	BTB-2700	
R36	330KΩ	½	60-699	BTS-330K	
R37	390KΩ	½	60-699	BTS-390K	
R38	100KΩ	½	60-801	BTS-100K	
R39	100KΩ	½	60-801	BTS-100K	
R40	100KΩ	½	60-801	BTS-100K	
R41	33KΩ	½	60-744	BTS-33K	
R42	10KΩ	2	60-761	BTB-10K	
R43A	1200		† 33-101	BTS-120	
B	68KΩ			BTS-68K	Note 1
R44	27KΩ	½	60-794	BTS-27K	
R45	20Meg	½	60-761	BTS-10Meg	
R46A	500KΩ	½	† 33-102	BTS-470K	
B	500KΩ	½	60-794	BTS-470K	
R47	560Ω	1	60-669	BTA-560	

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: AMC PART No.	IRC PART No.	NOTES
R48	820Ω	½	60-704	BTA-820	
R49	10KΩ	½	60-760	BTS-10K	
R50A	10KΩ	½		BTS-10K	
B	330K	½	*33-103	BTS-330K	
C	2.2Meg	½		BTS-2.2Meg	
R51	2.2Meg	½	60-688	BTS-2.2Meg	
R52	1Meg	½	60 879	BTS-1Meg	
R53	470KΩ	½	60-864	BTS-470K	
R54	22KΩ	½	60-744	BTS-22K	
R55	22KΩ	½	60-743	BTA-22K	
R56	33KΩ	½	60-695	BTS-33K	
R57	12KΩ	½	60 811	BTS-12K	
R58A	22KΩ	½		BTS-22K	
B	8200Ω	½	*33-100	BTS-8200	
C	8200Ω	½		BTS-8200	
R59	1Meg	½	60 879	BTS-1Meg	
R60	820KΩ	½	60-700	BTS-820K	
R61	10KΩ	½	60-760	BTS-10K	
R62	1Meg	½	60-879	BTS-1Meg	
R63	470Ω	½	60-697	BTS-470	
R64	100Ω	½	60-752	BTS-100	
R65	1000Ω	½	60-705	BTA-1000	
R66	560Ω	½		BTS 560	
R67	560Ω	½		BTS 560	
R68	330KΩ	½	60-699	BTS-33K	
R69	82KΩ 5%	½	60-705	BTS-82K 5%	
R70	820KΩ	½	60-700	BTS-820K	
R71	330KΩ 5%	½	60-787	BTS-330K 5%	
R72	4700Ω	½	60-759	BTS-4700	
R73	150KΩ	½	60-701	BTS-150K	
R74	68KΩ	½	60-808	BTS-68K	
R75	22KΩ	½	60-744	BTS-22K	
R76	150KΩ 5%	½	60-702	BTS-150K 5%	
R77	8200Ω	½	60-778	BTS-8200	
R78	47KΩ	½	60-680	BTS-47K	
R79	470KΩ	½	60-681	BTS-470K	
R80	47Ω	½	60-698	BTS-47	
R81	2700Ω	2		BTB-2700	Note 2
R82	8200Ω	2		BTB-8200	
R83	10KΩ	2	60-706	BTS-10K	
R84	3.3Ω		60-760	BTS-10K	
R85	47KΩ	½	60-680	BTS-47K	
R86	1750Ω	20	60-856	2D-1750	

† Items R43A, R43B, C44A, C44B and C44C are combined in one unit.
‡ Items R46A, R46B, C46A, C46B and C46C are combined in one unit.
* Items R50A, R50B, R50C, C48A, C48B and C48C are combined in one unit.
# Items R58A, R58B, R58C, C50A, C50B, C50C are combined in one unit.
Note 1, Some versions use a 250KΩ resistor in this application.
Note 2, Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING: USE	SEC. 1	SEC. 2	REPLACEMENT DATA: AMC PART No.	Holdorson PART No	Merit PART No	RCA TYPE No	Stancor PART No	Thordorson PART No	Triad PART No
T1	LITVAC	490VCT	5VAC	80-269		P-3076 ① ②		P-8232 ① ③	26R33 ④	
	@ 1.44A	230ADC	@ 3A							
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @ 8.7A									

① Enlarge cut-out. Drill new mounting holes.
② Tape 7.3V @ .8A winding. Parallel and phase 6.3V & 7.1A and 1.2A windings for Sec. #3
③ Use high voltage tape on Sec. #1 only. Tape low tape Parallel and phase 6.3V & 6.5A windings for Sec. #3
④ Tape 5V & 3A winding Parallel and phase 6.3V & 5A windings for Sec. #3

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: AMC PART No	Holdorson PART No	Merit PART No	RCA PART No	Rem PART No	Stancor TYPE No.	Thordorson PART No	Triad PART No
T2	Vert. Osc. Trans.	80-258	S6702	A-3003	209T1 ①	V405	A-8125	26A03	A-97X
T3	Horiz. Output Trans.	80-270	† B411 * ①	HVO-9 * ①	230T1 * ①	X080 * ①	A-8255 *	FLY-76 *	D-98 * ①
T4	Vert. Output Trans.	80-288	Z1802	A-3038	204T2 ①	V307	A-8144	28872	A-108X
T5A	Yoke-Horiz. (23MDP)	80-810 ②	DF805 ②	MDP-23	222D1 ①	Y70F20243	DY-11A ②	Y-10 ② ④	Y-10-13 ④
B	Vert. (27MDP)			① ④		① ④	①		④
T6	Width Coil (2-8.5MH)	10-604		MWC-6 ③	21UR1	20UR15	WC-6	WC-22	WC-12 ③

① Drill new mounting hole(s).
② Includes capacitor C70, resistors R86, and R87.
③ Use original rear cover and centering device
④ Use original horizontal yoke damping network.
⑤ Enlarge mounting hole.
⑥ Connect to coded blue and green terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Repacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Holdorson Replacement Connections	Merit Replacement Connections	RCA Repacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
	4	8	8	9	8	5	5	9
	7	8	8	8	Jumper T & 8	4	4	Jumper T & 8
	8	See Note ①	See Note ①	See Note ①	See Note ①	See Note ①	See Note ①	See Note ①
	5	2	2	3	2	2	2	3
	1	1	1	1	1	1	1	1
Connect Width Coil Wires	5 & 1	3 & 1	3 & 1	3 & 1	3 & 1	2 & 1	2 & 1	3 & 1
Space Heater		①	①	①	①	①	①	①

⑦ Connect R63 in series with C70 across terminals #3 and #7 of yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: AMC PART No	Holdorson PART No	Merit PART No	Stancor PART No	Thordorson PART No	Triad PART No	NOTES
T7	6.6KΩ	3.9Ω	80-271	Z1113	A-2931	A-3870	24S52	S-7X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP	REPLACEMENT DATA: AMC PART No	QUAM PART No	NOTES
SP1	7"	PM	3.9Ω	79-390	7A3L	

COILS (RF-IF)

ITEM No	USE	DC RES: PRI.	SEC.	REPLACEMENT DATA: AMC PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	MF Trap	0Ω						Wound on 68MMF cap
L2	IF Trap	0Ω						Wound on 68MMF cap
L3	Ant. Coils	0Ω	0Ω CT	0Ω				
L4	IF Trap	1Ω						
L5	F11. Choke	0Ω						
L6	Neut. Coil	0Ω						
L7	RF, Mixer Grid & Osc. Coils	0Ω						
L8	F11. Choke	0Ω						
L9	RF Coil	0Ω						
L10	Feedback Coil	1.5Ω						
L11	Cone Plate	0Ω						
L12	1st. Video IF	.2Ω		80-805	17-4522 *	TV-120 *	6219 *	
L13	2nd Video IF	1Ω	.1Ω	80-806			6222	Includes 47. 25MC trap
L14	3rd Video IF	1Ω	.1Ω	80-807				Includes 41. 25MC trap
L15	4th. Video IF	.1Ω	.1Ω	80-808	17-4523	TV-130	6219	
L16	Series Peaking Coil	4.2Ω		10-613	19-3100 ■	TV-131 ■	6172 ■	102 Microhenries, wound on 10KΩ resistor
L17	Shunt Peaking Coil	9.5Ω		10-614	19-3500		6174	470 Microhenries
L18	Series Peaking Coil	8Ω		10-611	19-3300 ■		6155 ■	315 Microhenries, wound on 10KΩ resistor

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AMC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L19A B	4.5MC Trap Sound IF	1.9Ω		10-554				
L20	Shunt Peaking Coil	9.5Ω		10-612	19-4400 ▲		4566 ▲	433 Microhenries, wound on 27KΩ resistor
L21	Ratio Det.	5.5Ω	1.8Ω CT	10-553	17-3497	TV-115	6205	Tertiary winding -.6Ω
L22	Horiz. Osc.	19Ω	50Ω	10-609	20-1402 ♦	TV-162 ♦	6183 ♦	Waveform winding -48Ω

* Use one winding only.
■ Parallel with 10KΩ resistor.
▲ Parallel with 27KΩ resistor.
♦ Reverse coil mounting in can.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA AMC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L23	.220ADC	15.2Ω	.65 HY	80-302	C5041 ①		C-2328 ①		C-21X

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	AMC PART No. FUSE	AMC PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG P/T	1/4A 250V	43-13		318.250 (3AG-P/T-1/4A)		GJV 1/4	

MISCELLANEOUS

ITEM No.	PART NAME	AMC PART No.	NOTES
M2	Tuner	TV1009	VHF
M3	Centering Device		Part of Yoke Cover (T5)
M4	Ion Trap		
B1	Trimmer Cap.	20-147	Horiz. Lock (10-165MMF)
B4	Trimmer Cap.	20-147	Horiz. Lock (10-165MMF)
	Knob	52-143	Channel Selector
	Knob	52-144	Fine tuning
	Knob	52-149	Contrast
	Knob	52-150	On-off-volume
	Knob	52-151	Vert. Hold
	Knob	52-152	Horiz. Hold
	Safety Glass	40-223	
	Mask	14-134	

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TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V12, V13, V14 and V15. Check fuse, M1. Check waveform, W12.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, C69, C67, C68, C66, R81, R82 and other associated components.	Check L22, R78, R75, R74, R77, C61, C62, C63, C65 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V13, V14 and V16. Check C65, R81, R82, T3, T5A and other associated components. Check adjustments B4 and B5.

BLOOMING

Check by substitution V13, V14, V15 and V16. Check C65, R81, R82 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the top of the chassis. Remove rear cover and supply power to the set.

Set the horizontal hold control at the center of its range .

Adjust the horizontal lock trimmer (B1) until picture synchronizes horizontally.

If picture fails to lock in sync refer to "Horizontal Sweep Circuit Adjustments" on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L21) located on top of the chassis.

FUSES

One fuse is used for horizontal and vertical sweep circuit protection. (For location see tube placement chart).

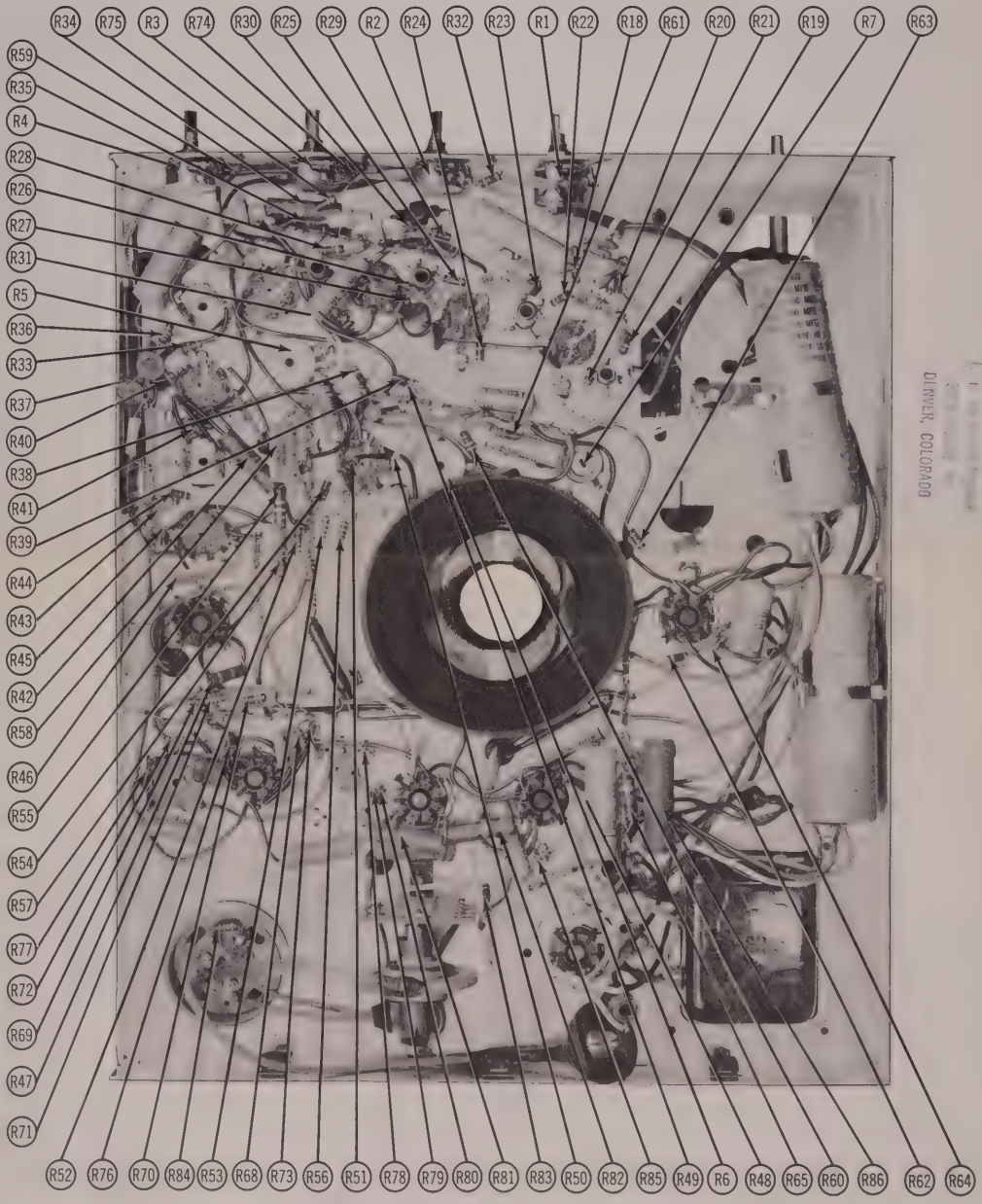
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL WITH MOUNTING BOARD

1. Remove 6 push on type control knobs from top panel of cabinet.
2. Remove 12 wood screws and 1 metal screw. Remove rear cover.
3. Disconnect speaker leads.
4. Remove 2 wood screws. Remove antenna terminal strip.
5. Remove 4 chassis mounting board bolts. Remove chassis with mounting board.
6. Remove 2 speaker nuts. Remove speaker.



DENVER, COLORADO

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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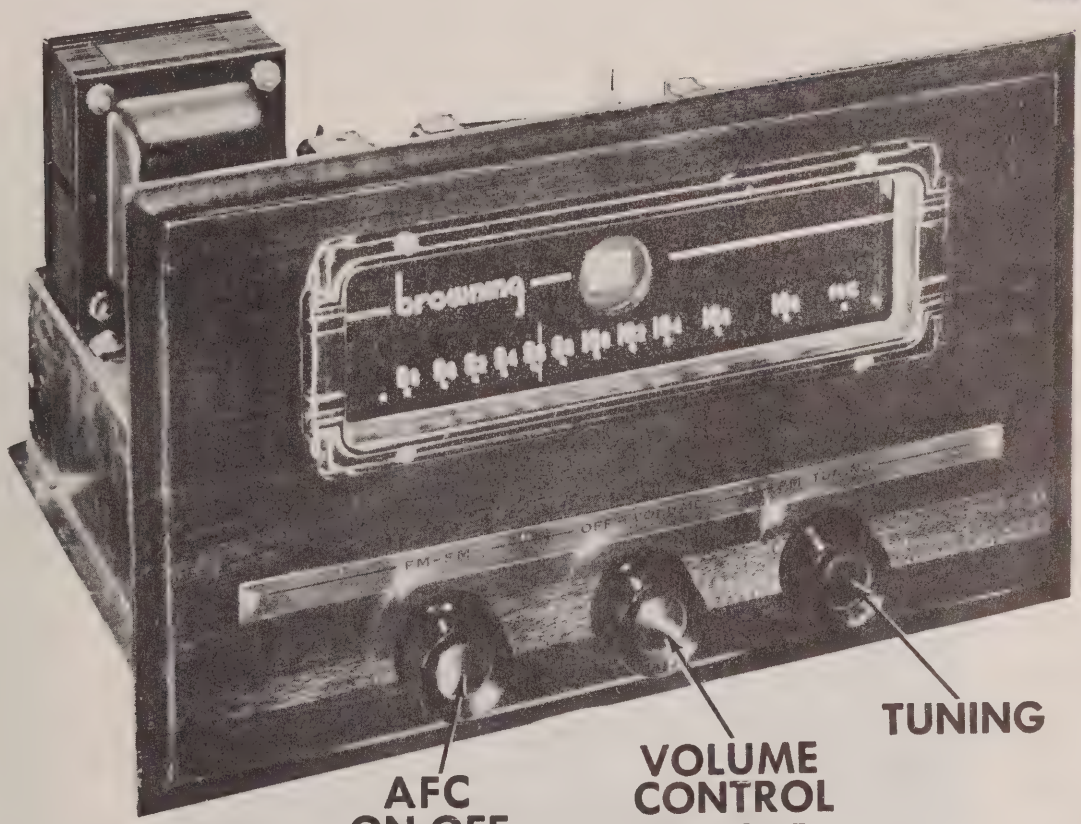

BROWNING
MODEL RV-32

TRADE NAME	Browning Model RV-32
MANUFACTURER	Browning Laboratories, Inc., Winchester, Mass.
TYPE SET	AC Operated FM Superheterodyne Tuner For Custom Installation
TUBES	Eleven
POWER SUPPLY	110-120 Volts AC-50/60 Cycles RATING .6 Amp. @ 117 Volts AC
TUNING RANGE-FM	88MC-108MC

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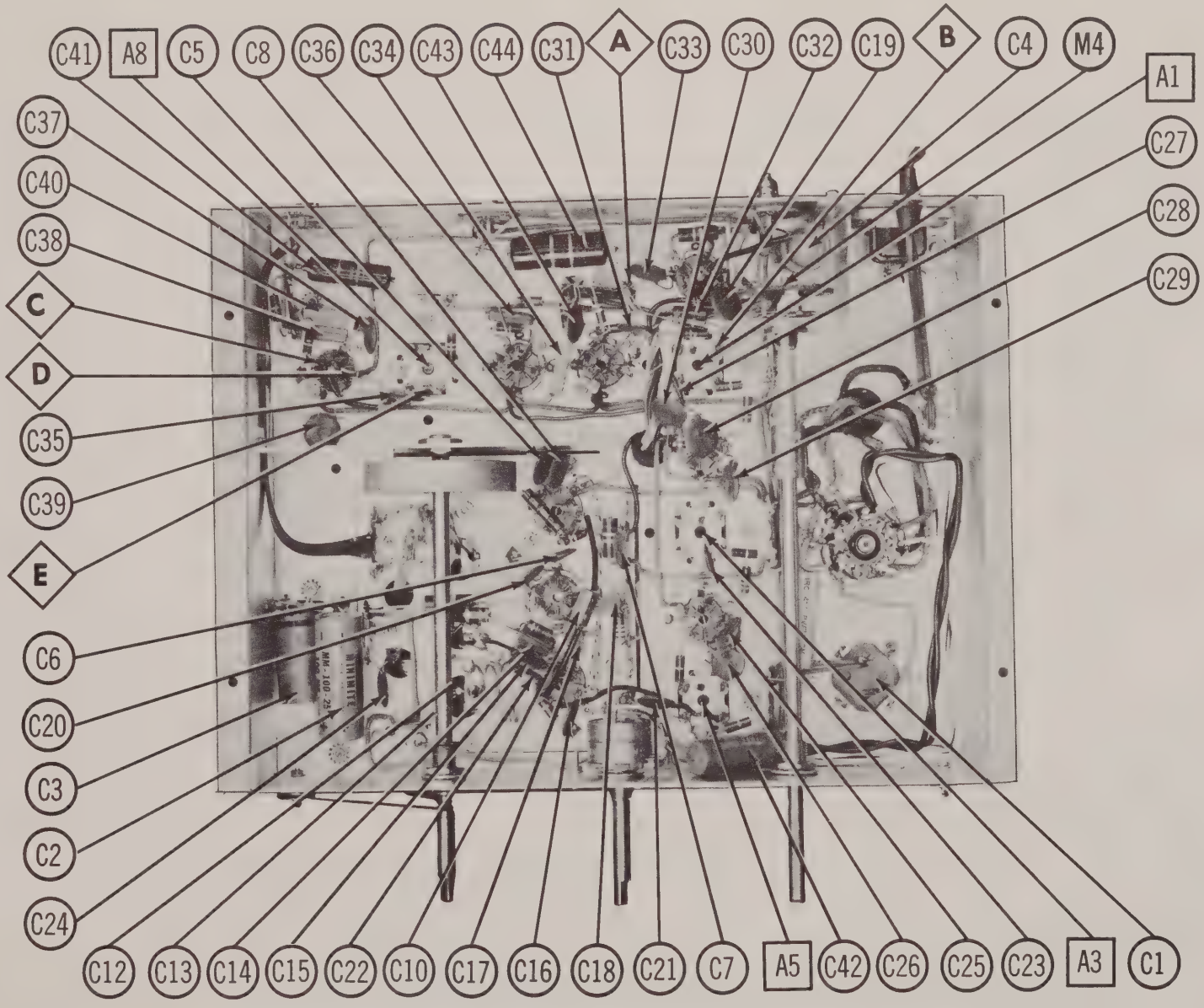
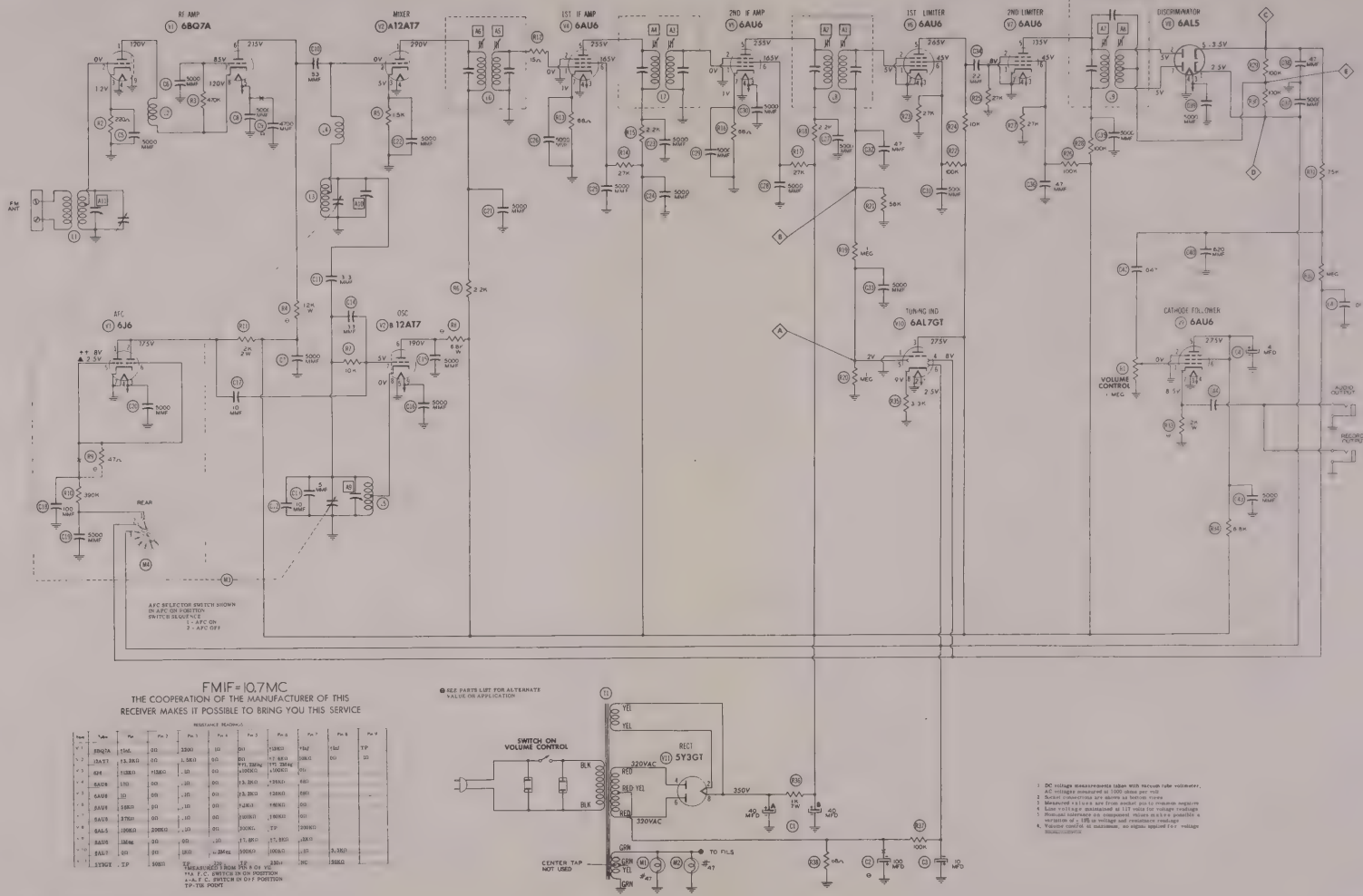


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



FMIF=10.7MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	15Ω	0Ω	330Ω	1Ω	0Ω	150KΩ	+1MΩ	+1MΩ	TP
V2	12AT7	13.5KΩ	0Ω	1.5KΩ	0Ω	0Ω, TYP. 2MEG	47 KΩ	68KΩ	0Ω	1Ω
V3	6J6	115KΩ	115KΩ	1Ω	0Ω	470KΩ	100KΩ	1Ω		
V4	6AU6	170	0Ω	1Ω	0Ω	13.5KΩ	135KΩ	68Ω		
V5	6AU6	1Ω	0Ω	1Ω	0Ω	13.5KΩ	135KΩ	68Ω		
V6	6AU6	1Ω	0Ω	1Ω	0Ω	42KΩ	190KΩ	0Ω		
V7	6AU6	170Ω	0Ω	1Ω	0Ω	190KΩ	190KΩ	0Ω		
V8	6AL5	190KΩ	200KΩ	1Ω	0Ω	330KΩ	TP	200KΩ		
V9	6AU6	135Ω	2Ω	0Ω	1Ω	17.5KΩ	17.5KΩ	12KΩ		
V10	6AL7	0Ω	2Ω	1KΩ	1.2MΩ	900KΩ	900KΩ	1Ω	3.3KΩ	
V11	5Y3GT	TP	500Ω	TP	TP	TP	TP	330Ω	NC	250Ω

RESISTANCE FROM PIN 8 OF V8 TO GROUND
TMEASURED WITH VTVM
*IN A.F.C. SWITCH IN ON POSITION
**IN A.F.C. SWITCH IN OFF POSITION
TP-TUB POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Turn AFC switch to "off" position.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection. Attenuate signal generator output to maintain maximum deflection of 5 volts.
2.	Deviate signal generator frequency 25KC above and below 10.7MC. The VTVM reading should be approximately the same above and below the center frequency and should continue to be equal out to a 75KC departure from 10.7MC. If not, repeat steps 1 & 2 until such condition exists.							
3.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point (C). Common to point (D).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
4.	"	"	"	"	"	DC probe to point (E). Common to point (B).	A8	Adjust for maximum deflection. Repeat steps 3 & 4.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point (B). Low side to chassis.	A1, A2, A3, A4, A5, A6	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	"	Vert. Amp. to point (E). Low side to chassis.	A8	"
3.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A7	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. Slightly retouch A8 for maximum amplitude and straightness of crossover lines. Proceed with step 5.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω resistors in each lead.	108MC	FM	108MC	DC probe to point (A). Common to chassis.	L4	Slightly expand or compress L4 coil turns for maximum deflection.
6.	"	"	88MC	"	88MC	"		Expand (spread) or compress oscillator rotor plates for maximum deflection.
7.	"	"	108MC	"	108MC	"	A9, A10	Adjust for maximum deflection. Repeat steps 5 & 7 for best results. Then repeat step 6.
8.	"	"	88MC	"	88MC	"		Expand or compress mixer rotor plates for maximum deflection, if necessary, as indicated by use of tuning wand on mixer grid coil.
9.	"	"	108MC	"	108MC	"	A11	Adjust for maximum deflection.

FIG. 1

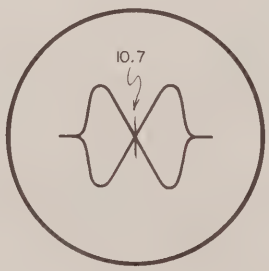


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		BROWNING PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6BQ7A	6BQ7	9AJ	
V2	Mixer-Osc.	12AT7	12AT7	9A	
V3	AFC	6J6	6J6	7BF	
V4	1st IF Amp.	6AU6	6AU6	7BK	
V5	2nd IF Amp.	6AU6	6AU6	7BK	
V6	1st FM Limiter	6AU6	6AU6	7BK	
V7	2nd FM Limiter	6AU6	6AU6	7BK	
V8	Discriminator	6AL5	6AL5	6BT	
V9	Cathode Follower	6AU6	6AU6	7BK	
V10	Tuning Indicator	6AL7GT	6AL7GT	8CH	
V11	Rectifier	5Y3GT	5Y3GT	5T	

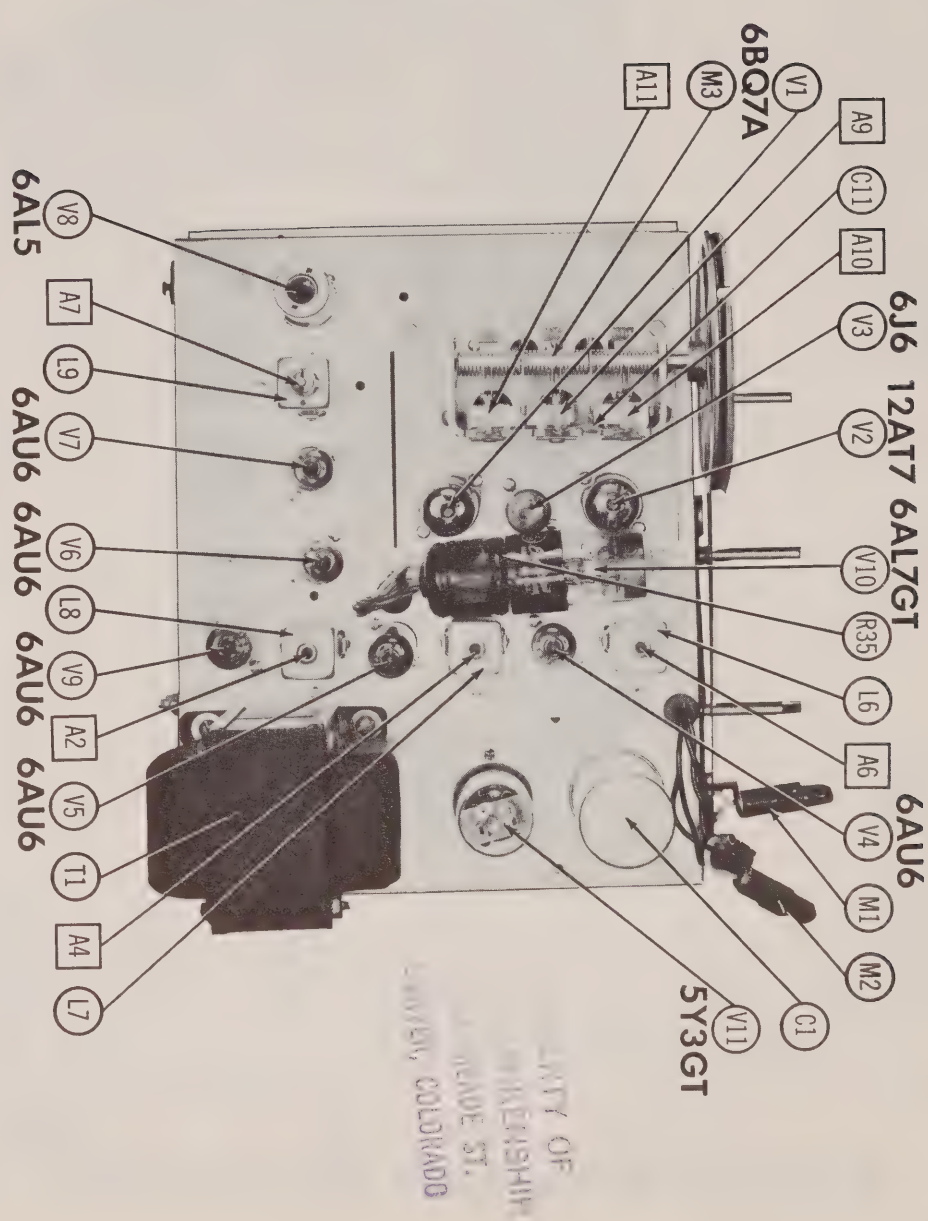
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	BROWNING PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲40	450				FP238	TM-D40-450	D-235	
B	▲40	450							
C2	100	25				TC2501	TD-100-25	MTH-2510	Note 1.
C3	10	25				TC22	TD-10-25	FM-0210	
C4	4	450				TC70	TD-4-450	FM-4504	
C5	5000			DD-502	811-005	DC525		C-1250	
C6	5000			DD-502	811-005	DC525		C-1250	
C7	5000			DD-502	811-005	DC525		C-1250	
C8	5000			DD-502	811-005	DC525		C-1250	
C9	4700			DD-472	811-0047	DC525		C-1250	Note 1.
C10	33	500		TCZ-33	NPOL-330	ZT-5433		KR-1433	
C11	3.3			TCZ-3R3	NPOA-3R3	ZT-5533			
C12	10							KR-1410	
C13	5			TCN-5	N750A-050	NT-555		KR-1550	
C14	33	500		TCZ-33	NPOL-330	ZT-5433		KR-1433	
C15	5000			DD-502	811-005	DC525		C-1250	
C16	5000			DD-502	811-005	DC525		C-1250	
C17	10	500		TCZ-10	NPOA-100	ZT-541		KR-1410	
C18	100			TCZ-100	NPO-337-101	ZT-531		KR-1310	
C19	5000			DD-502	811-005	DC525		C-1250	
C20	5000			DD-502	811-005	DC525		C-1250	
C21	5000			DD-502	811-005	DC525		C-1250	
C22	5000			DD-502	811-005	DC525		C-1250	
C23	5000			DD-502	811-005	DC525		C-1250	
C24	5000			DD-502	811-005	DC525		C-1250	
C25	5000			DD-502	811-005	DC525		C-1250	
C26	5000			DD-502	811-005	DC525		C-1250	
C27	5000			DD-502	811-005	DC525		C-1250	
C28	5000			DD-502	811-005	DC525		C-1250	
C29	5000			DD-502	811-005	DC525		C-1250	
C30	5000			DD-502	811-005	DC525		C-1250	
C31	5000			DD-502	811-005	DC525		C-1250	
C32	47	500		TCZ-47	NPO-338-470	ZT-5447		KR-1447	
C33	5000			DD-502	811-005	DC525		C-1250	
C34	22	500		TCZ-22	NPOK-220			KR-1422	
C35	5000			DD-502	811-005	DC525		C-1250	
C36	47	500		TCZ-47	NPO-338-470	ZT-5447		KR-1447	
C37	5000			DD-502	811-005	DC525		C-1250	
C38	47	500		TCZ-47	NPO-338-470	ZT-5447		KR-1447	
C39	5000			DD-502	811-005	DC525		C-1250	
C40	620	500						KR-1362	
C41	.01	600		D6-103	GP3-333-103	PT611	IMP6-S1	330611	
C42	.047	600		DF-503		PT6147	IMP6-S47	3306147	
C43	5000			DD-502	811-005	DC525		C-1250	
C44	.1	400		DF-104		PT401	IMP4-P1	330401	

Note 1. Not used in some versions.

CHASSIS—TOP VIEW



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PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BROWNING PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	AM7069	Q13-137	A47-1Meg-Z	B-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	1-S-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROWNING PART No.	IRC PART No.	
R2	220Ω	½		BTS-220	
R3	470KΩ	½		BTS-470K	
R4	12KΩ	1		BTA-12K	Note 1.
R5	1500Ω	½		BTS-1500	
R6	2200Ω	½		BTS-2200	
R7	10KΩ	½		BTS-10K	
R8	6800Ω	1		BTA-6800	Note 1.
R9	47Ω	½		BTS-47	Note 2.
R10	390KΩ	½		BTS-390K	
R11	12KΩ	2		BTB-12K	
R12	15Ω	½		BTS-15	
R13	68Ω	½		BTS-68	
R14	27KΩ	½		BTS-27K	
R15	2200Ω	½		BTS-2200	
R16	68Ω	½		BTS-68	
R17	27KΩ	½		BTS-27K	
R18	2200Ω	½		BTS-2200	
R19	1Meg	½		BTS-1Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROWNING PART No.	IRC PART No.	
R20	1Meg	½		BTS-1Meg	
R21	56KΩ	½		BTS-56K	
R22	100KΩ	½		BTS-100K	
R23	27KΩ	½		BTS-27K	
R24	10KΩ	½		BTS-10K	
R25	27KΩ	½		BTS-27K	
R26	100KΩ	½		BTS-100K	
R27	27KΩ	½		BTS-27K	
R28	100KΩ	½		BTS-100K	
R29	100KΩ	½		BTS-100K	
R30	100KΩ	½		BTS-100K	
R31	75KΩ 5%	½		BTS-75K 5%	
R32	1Meg	½		BTS-1Meg	
R33	12KΩ	1		BTA-12K	Note 1.
R34	6800Ω	½		BTS-6800	
R35	3300Ω	½		BTS-3300	
R36	1000Ω	7		PW7-1000	
R37	100KΩ	½		BTS-100K	
R38	68Ω	½		BTS-68	

Note 1. Some versions use a 10KΩ 1 Watt resistor in this application.
Note 2. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	BROWNING PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .6A	650VCT .070ADC	5VAC @ 2A	6.3VAC @ 3.1A		P9310①	P-3151①②	PC-8409①	24R04U①②	R-11A①

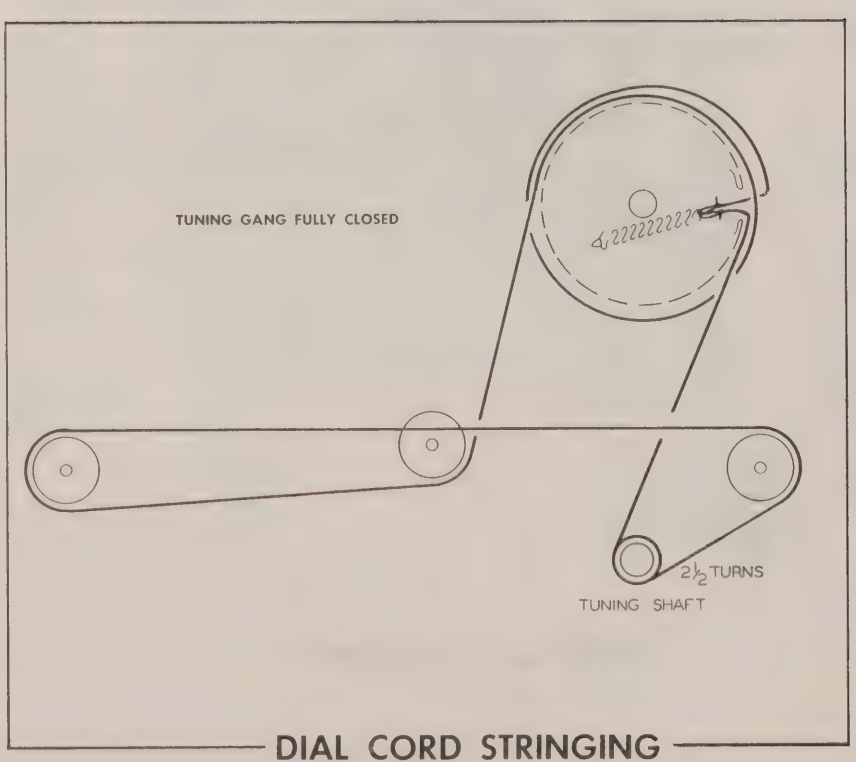
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	BROWNING PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω	0Ω*					*Tapped
L2	RF Coil	.1Ω			19-1000		4602	1UH
L3	FM RF Coil	0Ω						Tapped
L4	RF Coil	0Ω						
L5	FM Osc. Coil	0Ω						Tapped
L6	1st FM IF	1.2Ω	1.2Ω	16486-1	16-3487	FM-254	1463	
L7	2nd FM IF	1.2Ω	1.2Ω	16486-1	16-3487	FM-254	1463	
L8	3rd FM IF	1.2Ω	1.2Ω	16486-1	16-3487	FM-254	1463	
L9	Discriminator	1.3	1.4ΩCT	15808	17-3494	FM-253	1464	

PARTS LIST AND DESCRIPTIONS (Continued)

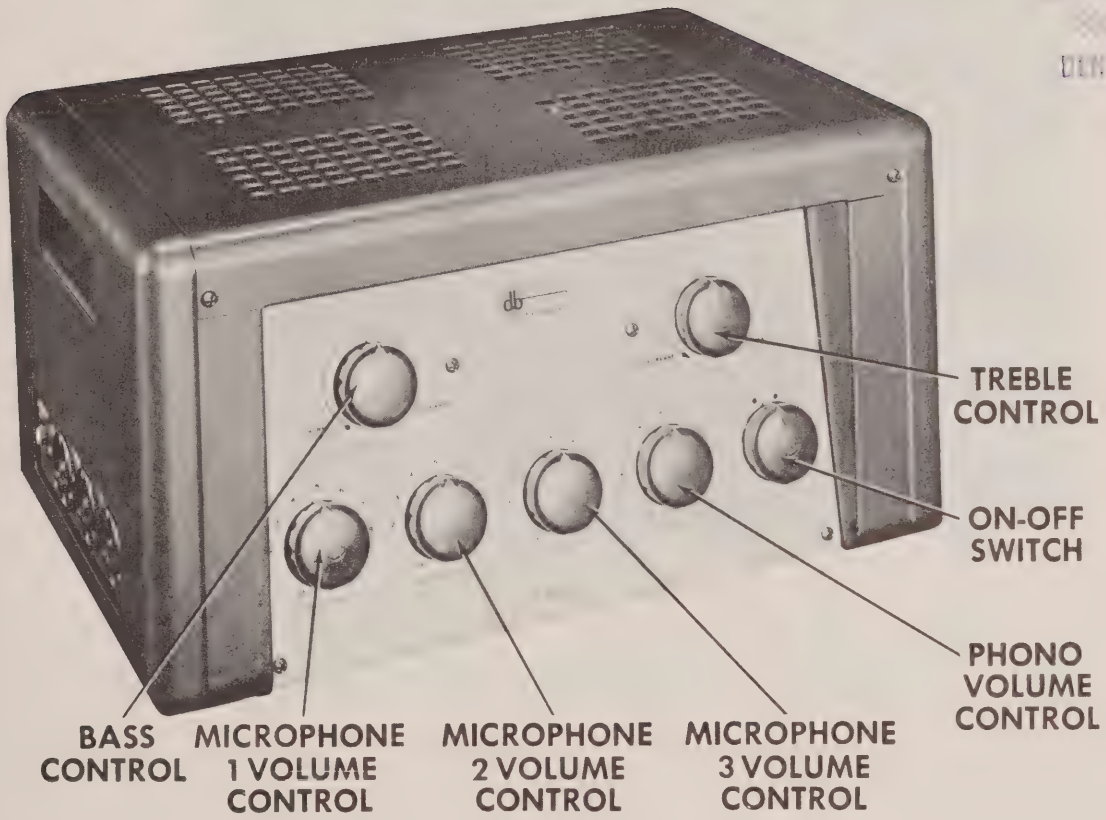
MISCELLANEOUS

ITEM No.	PART NAME	BROWNING PART No.	NOTES
M1	Dial Light	3141	#47-Some versions may use #1830 dial light.
M2	Dial Light		#47-Some versions may use #1830 dial light.
M3	Tuning Cap.		3 Gang
M4	Switch		On-Off (AFC) Rotary (Wafer Type)



DIAL CORD STRINGING

DAVID BOGEN
MODEL J-330



DAVID BOGEN
MODEL J-330

TRADE NAME	David Bogen Model J-330
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N. Y.
TYPE SET	AC Operated 4 Channel 30 Watt Audio Amplifier
TUBES (Eight)	Types (3) 6SF5 Mic. Preamp., 6SF5 AF Amp., 6SL7GT AF Amp.-Phase Inverter, (2) 6L6G Output, 5U4G Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	1.17 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
Model J-330

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		David Bogen PART No.	STANDARD REPLACEMENT		
V1	Mic. 1 Preamp.	6SF5	6SF5	6AB	
V2	Mic. 2 Preamp.	6SF5	6SF5	6AB	
V3	Mic. 3 Preamp.	6SF5	6SF5	6AB	
V4	AF Amp.	6SF5	6SF5	6AB	
V5	AF Amp. - Phase Inverter	6SL7GT	6SL7GT	8BD	
V6	Output	6L6G	6L6G	7S	
V7	Output	6L6G	6L6G	7S	
V8	Rect.	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

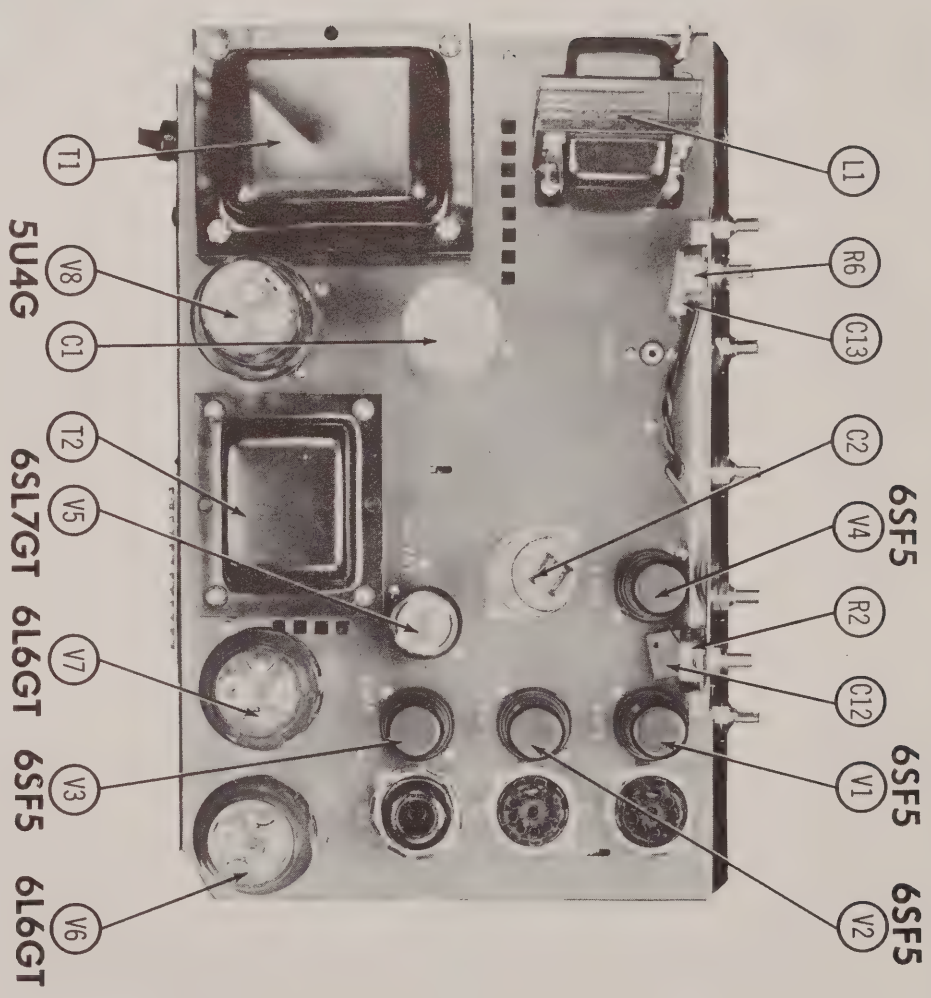
ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	David Bogen PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	8	500							
B	8	500							
C2A	■5	450				WP433.6	TM-QS-450	Q-030	
B	▲5	450							
C	▲5	450							
D	5	450				TC39	TD-50-50	FM-0550	
C3	50	50				PT4147	IMP4-S47	3304147	
C4	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C5	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C6	.047	400		DF-503		PT4122	IMP4-S22	3304122	
C7	.022	400				PT4122	IMP4-S22	3304122	
C8	.022	600				PT4122	IMP4-S22	3304122	
C9	.022	400				PT4133	IMP4-S33	3304133	
C10	.033	400				PT4147	IMP4-S47	3304147	
C11	.047	400		DF-503					
C12	820	500				PT4133	IMP4-S33	3304133	
C13	.0033	200				PT401	IMP4-P1	330401	
C14	.1	400		DF-104		PT401	IMP4-P1	330401	
C15	.1	400		DF-104		PT612	IMP6-S2	330612	
C16	.022	600		DF-203		PT401	IMP4-P1	330401	Note 1.
C17	.1	400		DF-104					

Note 1. Some versions may use a .047MFD @ 400V. in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	David Bogen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	V-202-C	Q13-133	A47-500K Z	B-60	U-48	Mic.1
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2	4Meg	½	V-129E					Bass Tapped at 45K
R3A	500KΩ	½	V-202-C	Q13-133	A47-500K-Z	B-60	U-48	Mic. 2
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	500KΩ	½	V-202-C	Q13-133	A47-500K-Z	B-60	U-48	Mic. 3
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	500KΩ	½	V-202-C	Q13-133	A47-500K-Z	B-60	U-48	Phono
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R5A
R6A	500KΩ	½	V-202-C	Q13-133	A47-500K-Z	B-60	U-48	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R6A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R7	2.2Meg	1/2		BTS-2.2Meg	
R8	220KΩ	1/2		BTS-220K	
R9	2.2Meg	1/2		BTS-2.2Meg	
R10	220KΩ	1/2		BTS-220K	
R11	220KΩ	1/2		BTS-220K	
R12	2.2Meg	1/2		BTS-2.2Meg	
R13	220KΩ	1/2		BTS-220K	
R14	220KΩ	1/2		BTS-220K	
R15	470KΩ	1/2		BTS-470K	
R16	100KΩ	1/2		BTS-100K	
R17	220KΩ	1/2		BTS-220K	
R18	1500Ω	1/2		BTS-1500	
R19	220KΩ	1/2		BTS-220K	
R20	47KΩ	1/2		BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R21	2200Ω	1/2		BTS-2200	
R22	220KΩ	1/2		BTS-220K	
R23	6800Ω 5%	1/2		BTS-6800 5%	
R24	2200Ω	1/2		BTS-2200	
R25	220KΩ	1/2		BTS-220K	
R26	100KΩ	1/2		BTS-100K	
R27	47Ω	1/2		BTS-47	
R28	200Ω	7		PW7-200	
R29	100KΩ	1/2		BTS-100K	
R30	47Ω	2			
R31	150KΩ	1/2		BTS-150K	
R32	4700Ω	1		BTA-4700	
R33A	20KΩ	16			
B	3000Ω	10			

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.17A	760VCT .142ADC	5VAC @ 3A	6.3VCT @ 3.3A	T-365-1A	PM-8411	P-2955		P9403	24R07

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6.4KΩ CT	500Ω tap @ 70V @ 16Ω, 8Ω, 4Ω	T261		A-3130①	A-3801			

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.142A	84.5Ω	4HY	T509	C5029	C-3196①	C-1411①	20C55①	C-15A①

① Drill new mounting holes.

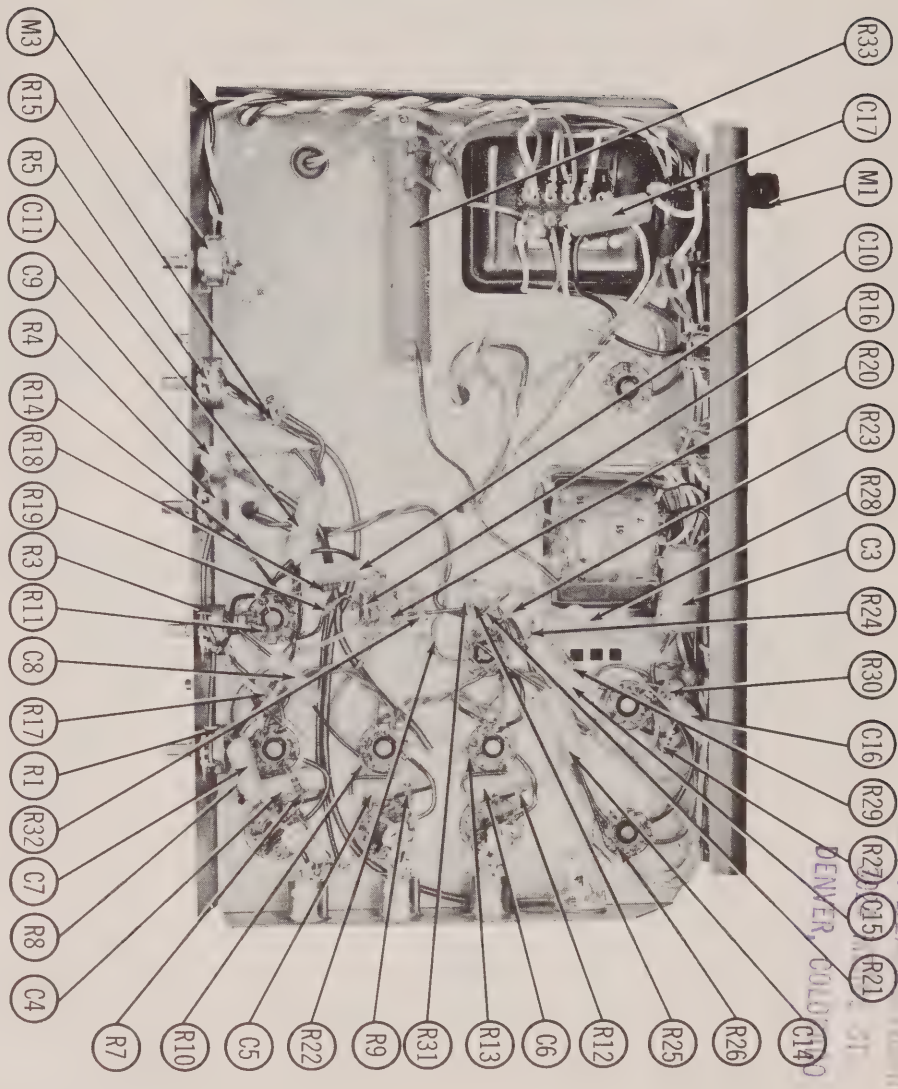
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	2A 125V			313002 (3AG S/B 2A)	342001	MDL2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M2 M3	Pilot Light Switch		#47, Bayonet On-Off-Power

CHASSIS—BOTTOM VIEW



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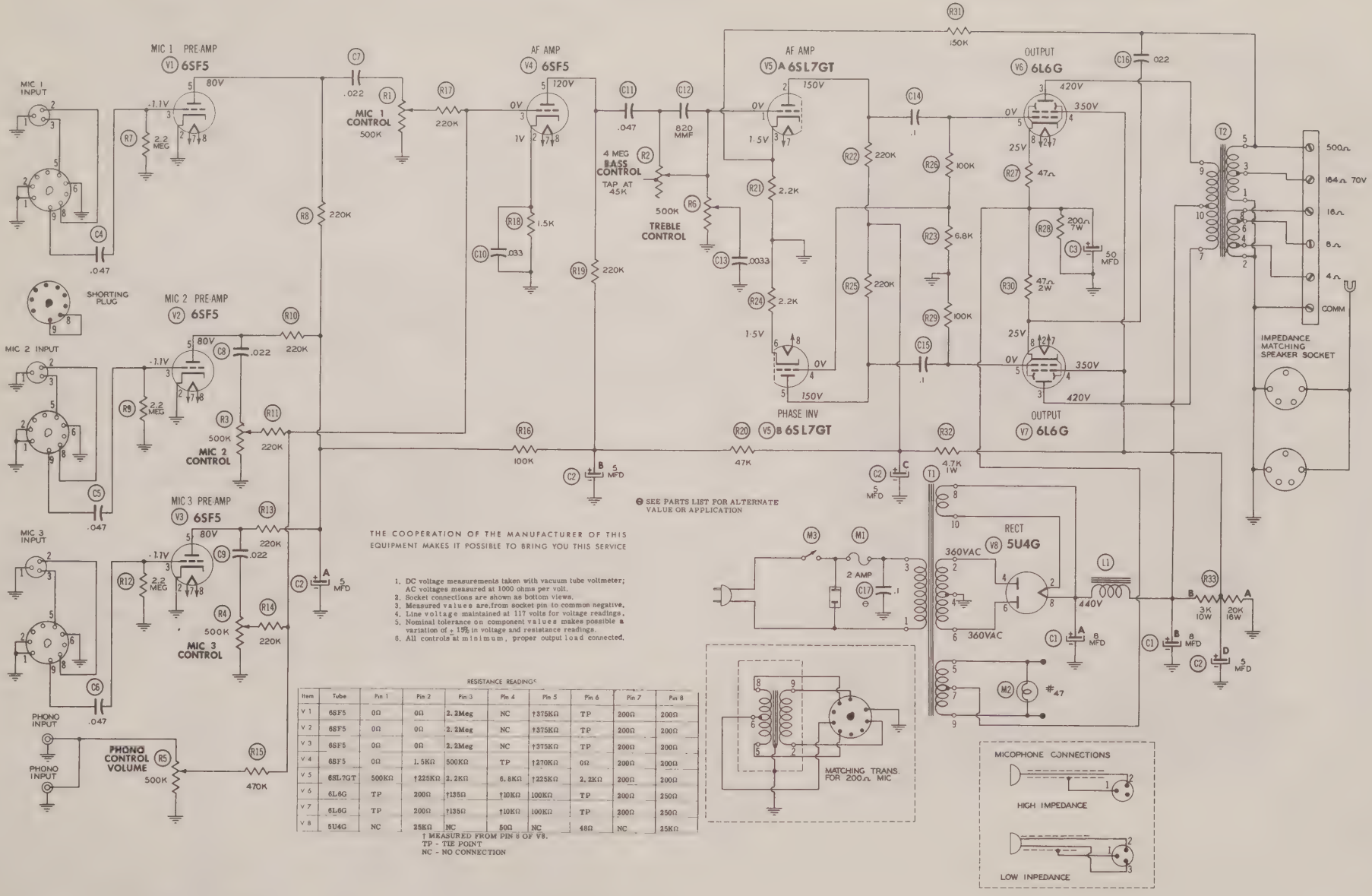

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SF5	0Ω	0Ω	2.2Meg	NC	†375KΩ	TP	200Ω	200Ω
V 2	6SF5	0Ω	0Ω	2.2Meg	NC	†375KΩ	TP	200Ω	200Ω
V 3	6SF5	0Ω	0Ω	2.2Meg	NC	†375KΩ	TP	200Ω	200Ω
V 4	6SF5	0Ω	1.5KΩ	500KΩ	TP	†370KΩ	0Ω	200Ω	200Ω
V 5	6SL7GT	500KΩ	†225KΩ	2.2KΩ	6.8KΩ	†225KΩ	2.2KΩ	200Ω	200Ω
V 6	6L6G	TP	200Ω	†135Ω	†10KΩ	100KΩ	TP	200Ω	250Ω
V 7	6L6G	TP	200Ω	†135Ω	†10KΩ	100KΩ	TP	200Ω	250Ω
V 8	5U4G	NC	25KΩ	NC	50Ω	NC	48Ω	NC	25KΩ

† MEASURED FROM PIN 8 OF V8.
TP - TIE POINT
NC - NO CONNECTION

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DENVER, COLORADO

EMERSON MODEL
830B (Ch. 120252-B)

EMERSON MODEL
830B (Ch. 120252-B)

TRADE NAME	Emerson Model 830B (Ch. 120252-B)
MANUFACTURER	Emerson Radio & Phono. Corp., 111 8th Ave., New York, N. Y.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det. -AVC-AF Amp., 3V4 Output
POWER SUPPLY RATINGS	105-125 Volts AC-DC (or) 7.5 Volts "A" Supply & 67.5 Volts "B" Supply .1 Amp. @ 117 Volts AC (or) 55MA @ 7.5 Volts DC & 7.5 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.005MFD	High side to pin 6 (grid of 1R5 (V1)- Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

EMERSON
Model 830B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1U4	1U4	6AR	
V3	Det. -AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	EMERSON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	40	150	925302			TCT3094	TDL-5322		
B	40	150							
C	250	10							
C2	.05	400	920554	DF-503		PT415	IMP4-S5	330415	
C3	10000		928742	DD-103	811-01	DC511			
C4	10000		928742	DD-103	811-01	DC511			
C5	2.2		915005	TCZ-2R2	NPOA-2R2				
C6A	200		♦928034	DD-201	811-201	UC-532		K-1320	
B	1000			DD-102	811-001	DC521		K-1210	
C	100			DD-101	801-101	UC-531		K-1310	
D	10000			DD-103	811-01	DC511		C-06110	
E	1000			DD-102	801-001	DC521		K-1310	
C7	2200		928662	DD-222	811-0022	DC522		C-1222	
C8	.1	400	920556	DF-104		PT401	IMP4-P1	330401	
C9	.05	200	920555	DF-503		PT415	IMP2-S5	330215	
C10	.047	400	920554	DF-503		PT4147	IMP4-S47	3304147	
C11	.047	400	920555	DF-503		PT4147	IMP4-S47	3304147	

♦ Items C6A, C6B, C6C, C6D, and C6E are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	1Meg	½	390214					Volume & Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R2	100KΩ	½		BTS-100K	
R3	15KΩ	½		BTS-15K	
R4	3.3Meg	½		BTS-3.3Meg	
R5	3.3Meg	½		BTS-3.3Meg	
R6	10Meg	½		BTS-10Meg	
R7	4.7Meg	½		BTS-4.7Meg	
R8	1Meg	½		BTS-1Meg	

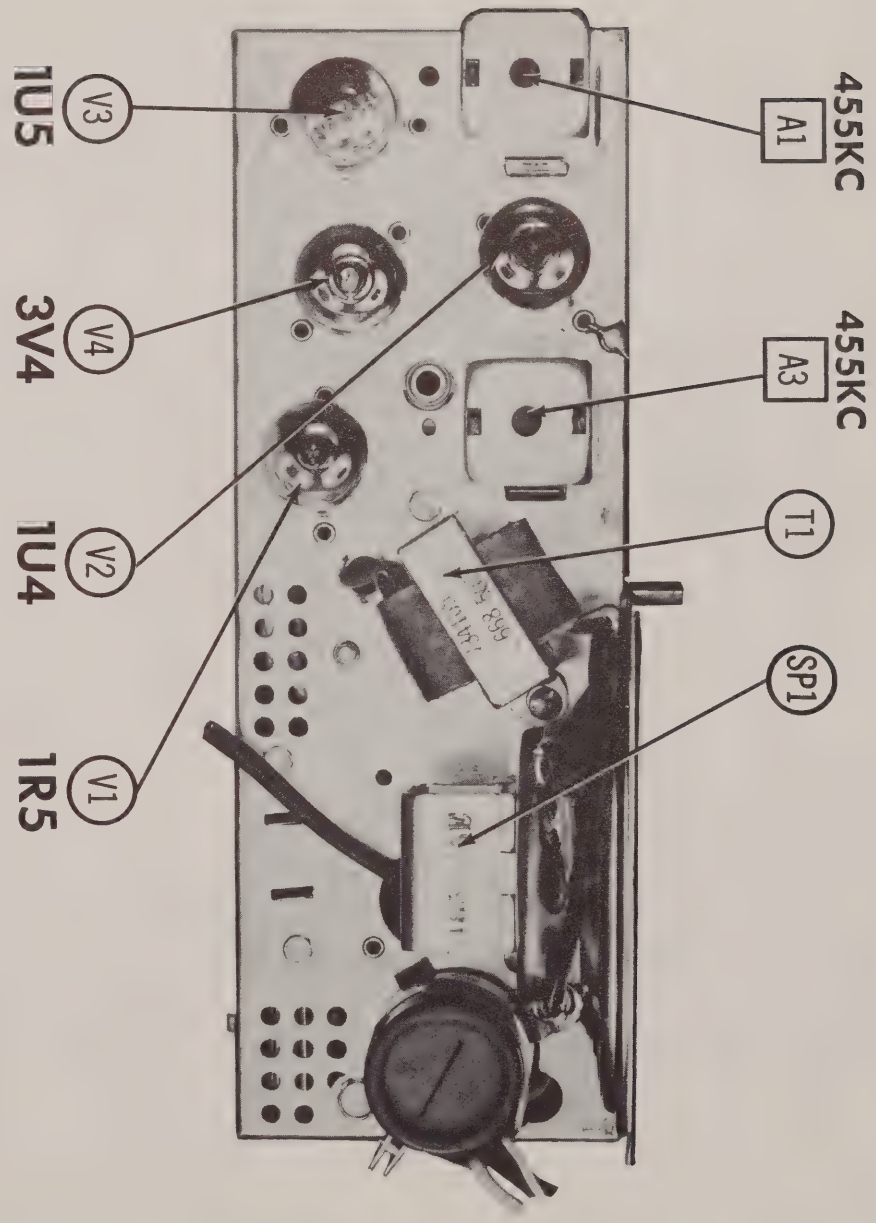
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R9	2.2Meg	½		BTS-2.2Meg	Note 1.
R10	22Meg	½		BTS-22Meg	Note 2.
R11	560Ω	½		BTS-560	
R12	2700Ω	½		BTS-2700	
R13	560Ω	½		BTS-560	
R14	1500Ω	½		BTS-1500	
R15	2200Ω	8			
R16	120Ω	2			

Note 1. Some versions use a 3.3Meg ½W resistor in this application.
Note 2. Not used in all versions.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	EMERSON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	9.4KΩ	3.4Ω	734105		A-2927			S-11Z	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	QUAM PART No.	
SP1	4"	PM	3.4Ω	180135	3A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Antenna coil	.7Ω		700103				
L2	Osc. coil	2.9Ω	12Ω	716096	14-1073		69-Osc.	
L3	Input IF	20Ω	20Ω	720525	16-6758	BC-352	12-C1	
L4	Output IF	34Ω	25Ω	720066A	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	EMERSON PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.06IA	817037	1263A	RS065	6S65	8J1	65	

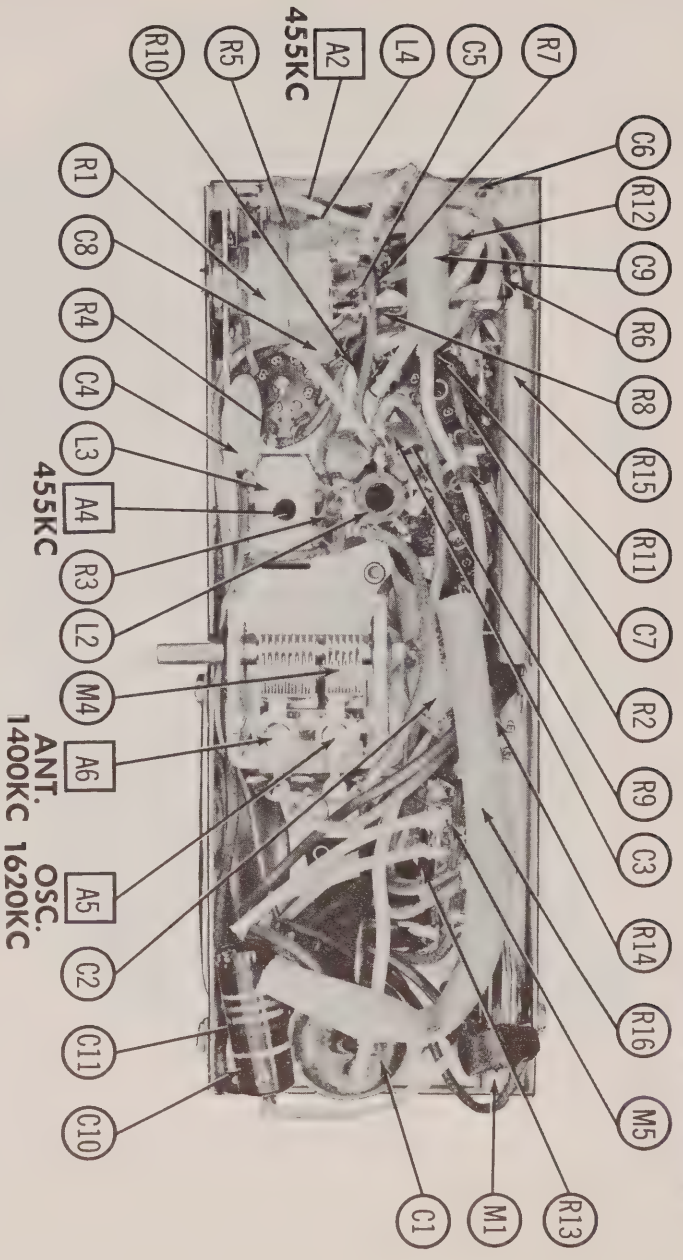
BATTERIES

ITEM No.	VOLTAGE	EMERSON PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	7.5V"A"	EM717	717			C5			
M3	67.5V"B"	EM467		467			XX45		

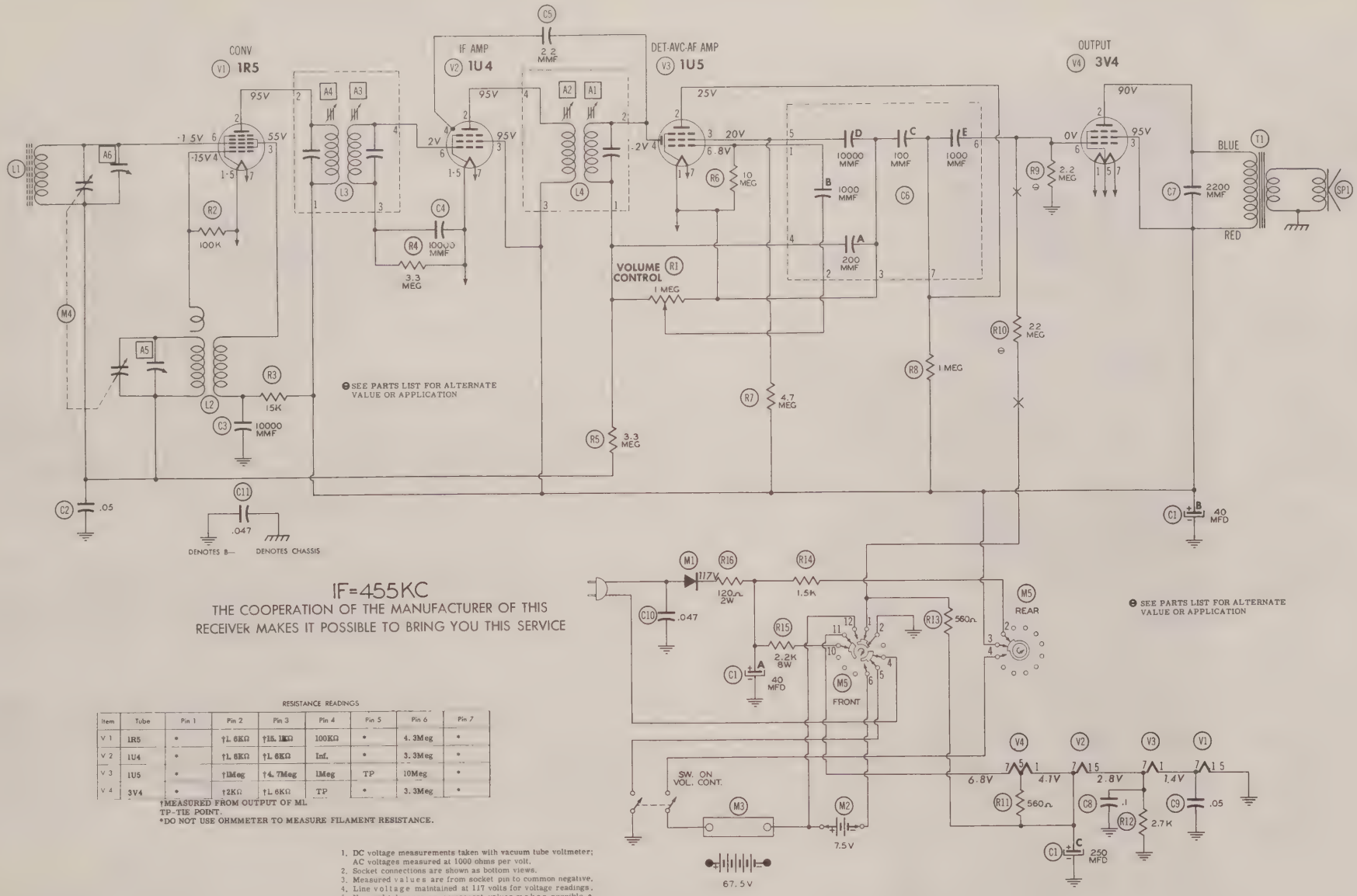
MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M4	Tuning Cap.	900126	2 Gang (10-215MMF, 14-125MMF)
M5	Switch	510109	Power Changeover
	Cabinet		Specify color for replacement.
	Handle	460356	Ebony
	Handle	460356A	Slate Grey
	Handle	460356B	Maroon
	Handle	460474	Forest Green
	Handle		
	Dial Knob Assy.		Specify color for replacement.
	Knob	450139A	Grey-On-Off-Volume

CHASSIS—BOTTOM VIEW



EMERSON
Model 830B



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†1.6KΩ	†15.1KΩ	100KΩ	*	4.3Meg	*
V 2	1U4	*	†1.6KΩ	†1.6KΩ	Inf.	*	3.3Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	1Meg	TP	10Meg	*
V 4	3V4	*	†2KΩ	†1.6KΩ	TP	*	3.3Meg	*

†MEASURED FROM OUTPUT OF M1 TP-TIE POINT.
*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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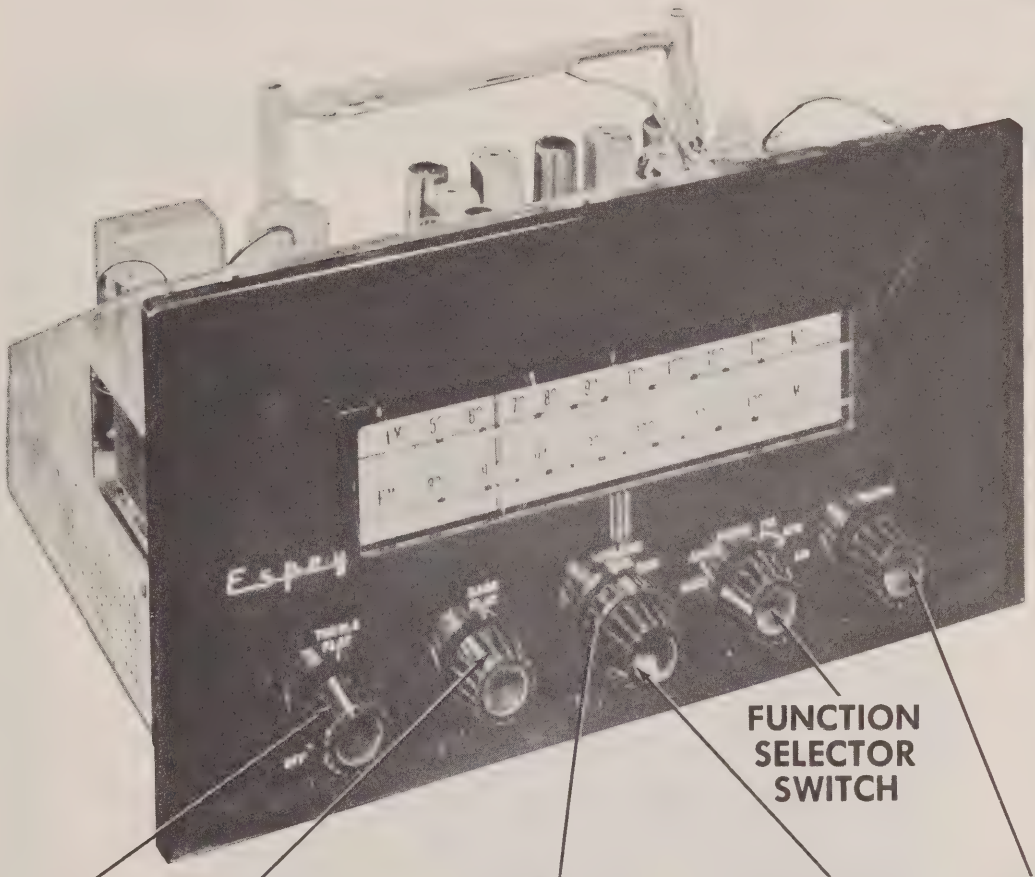
ESPEY
MODEL 700

L. P. [illegible]
[illegible] MAPLE ST.
DENVER, COLORADO

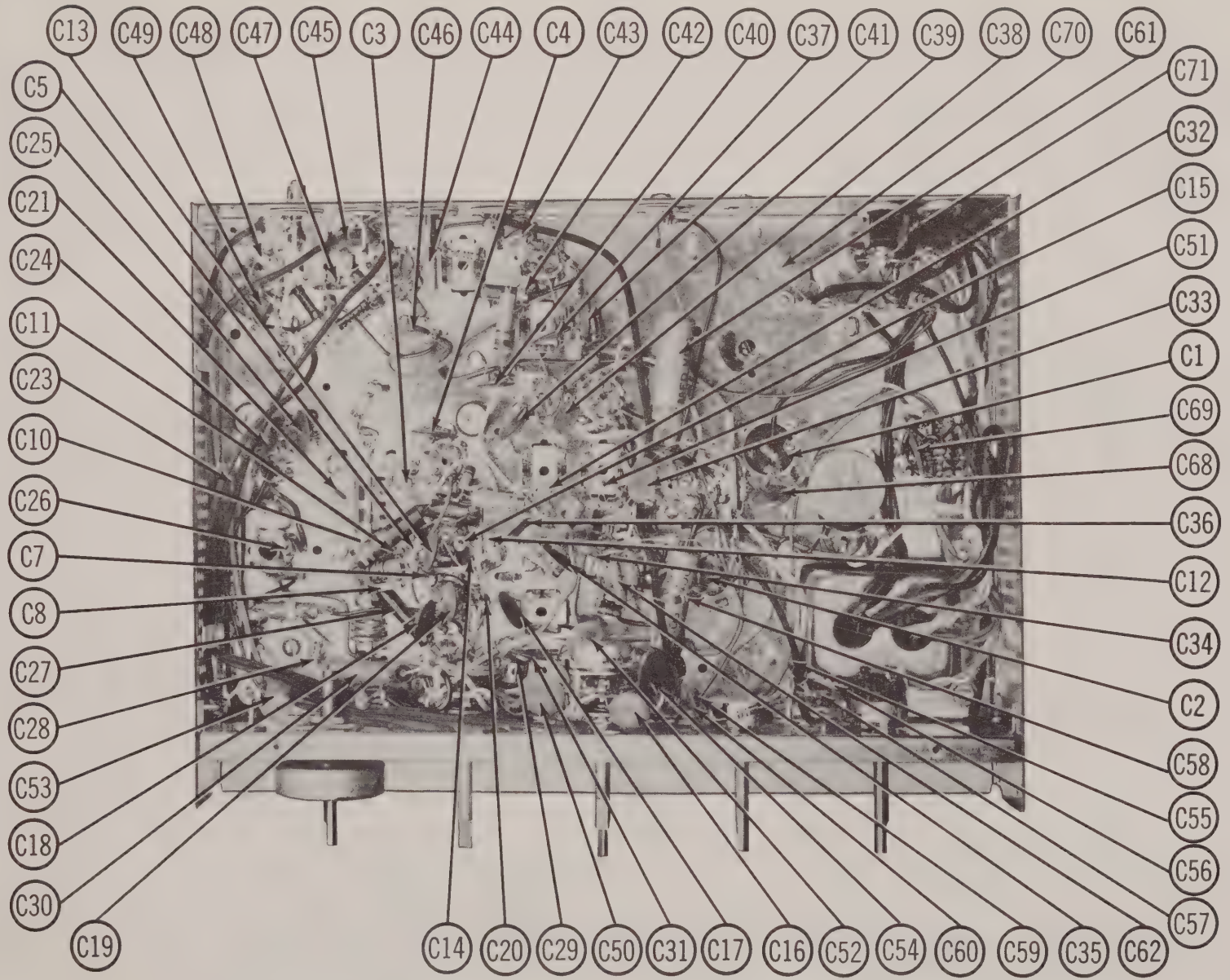
ESPEY
MODEL 700



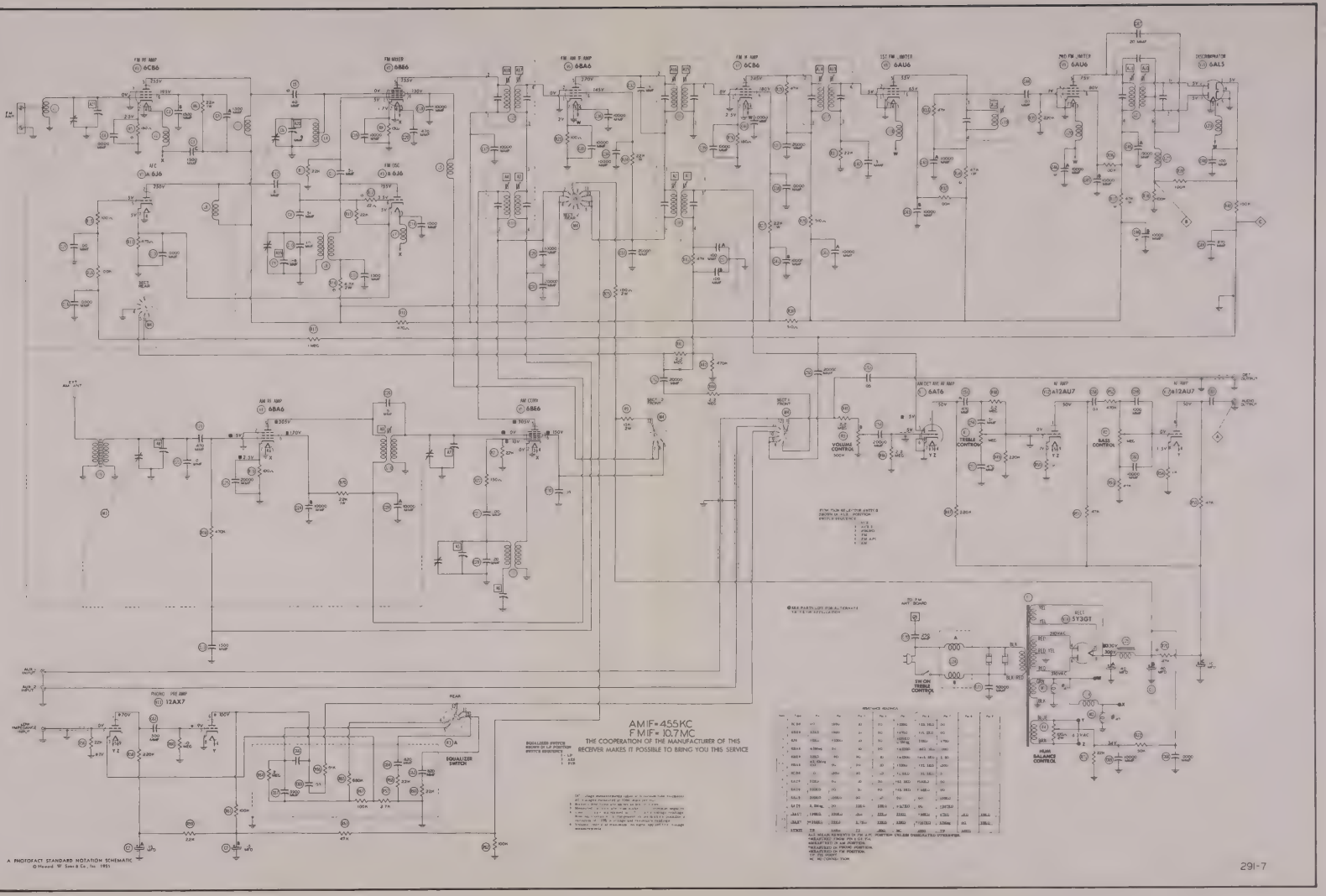
ESPEY
MODEL 700

TRADE NAME	Espey Model 700
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.
TYPE SET	AC Operated AM-FM Superheterodyne Tuner for Custom Installation
TUBES	Fourteen
POWER SUPPLY	105-125 volts AC-50/60 Cycles RATING .74 Amp. @ 117 volts AC
TUNING RANGE-BROADCAST	535KC-1720KC FREQ. MOD. 88MC-108MC

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


AM IF=455KC
FM IF= 10.7MC
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1951
291-7

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow 15 minutes warm up period for receiver & test equipment.
Set treble & bass controls to maximum clockwise position.
With tuning gang fully closed set pointer to index mark (small gold mark) to left of "55" on dial.
Amplifier & speaker should be connected for normal use during this alignment.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 6BA6 (V6). Low side to chassis.	455KC (400∿ Mod.)	AM	Tuning gang fully open.	DC probe to point (A). Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	"	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	"	"	"	"	A3, A4	"
3.	5MMF	High side to AM antenna terminal. Low side to chassis.	1700KC	"	1700KC	"	A5	"
4.	"	"	550KC	"	550KC	"	A6	Adjust for maximum deflection. Repeat steps 3 & 4 for proper oscillator tracking.
5.	"	"	1500KC	"	Tune to 1500KC signal.	"	A7, A8	Adjust for maximum deflection.
6.	"	"	600KC	"	Tune to 600KC signal.	"	A9	Adjust for maximum deflection. Repeat steps 5 &6 for proper RF tracking.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point (A). Common to chassis.	A11, A12, A13, A14, A15, A16, A17, A18	Adjust for maximum deflection.
8.	"	"	"	"	"	DC probe to point (B). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point (B). Low side to chassis.	A11, A12, A13, A14, A15, A16, A17, A18	Adjust for curve of maximum amplitude and symmetry similar to fig. 1.
8.		"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A10	Adjust so 10.7MC occurs at center of crossover lines similar to Fig. 2. Slightly retouch A11 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

Turn off AFC during RF Alignment.

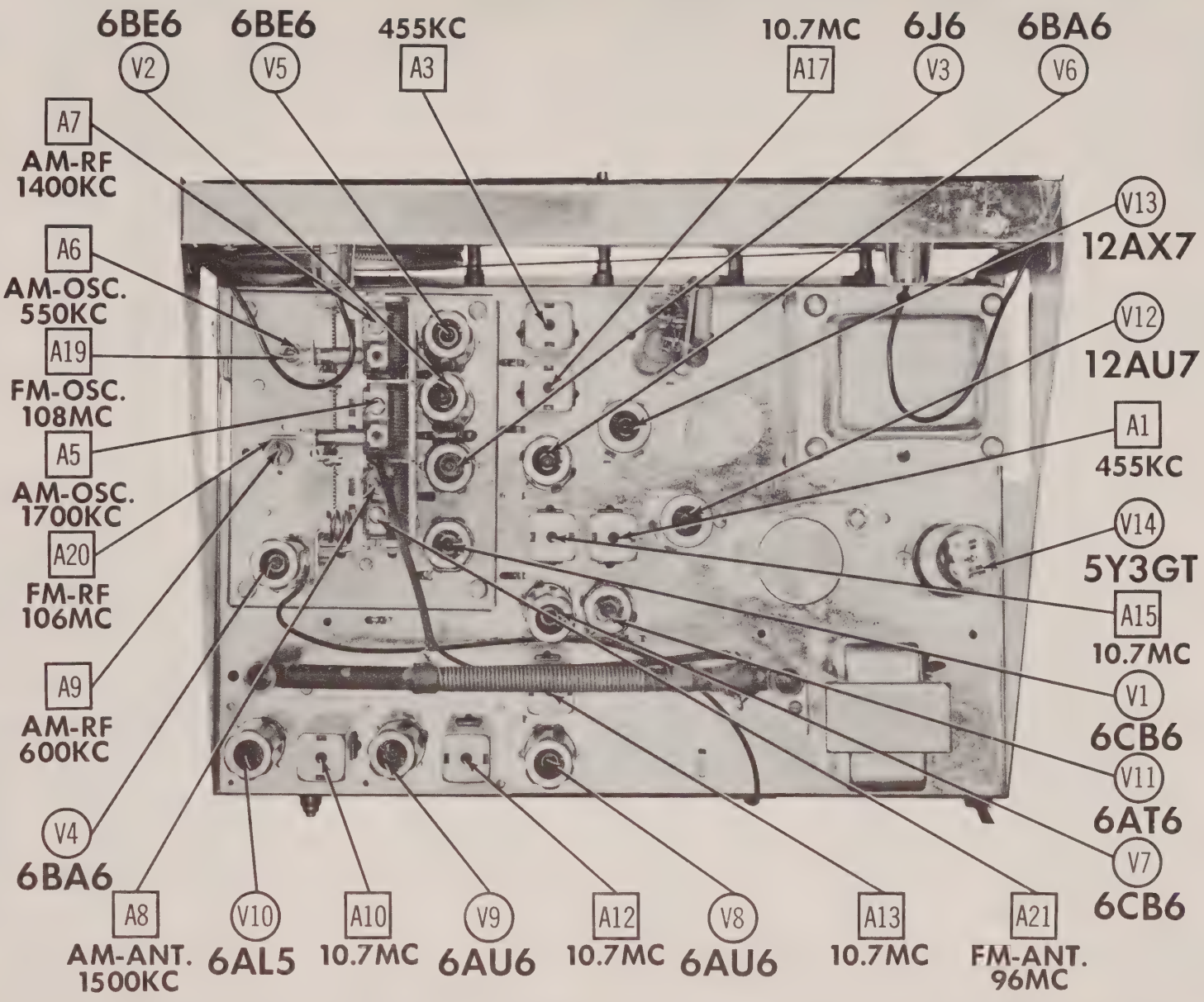
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω Carbon Resistor	High side thru 270Ω to FM antenna terminal. Low side to chassis.	108MC	FM	108MC	DC probe to point (C). Common to chassis.	A19	Adjust for maximum deflection.
10.	"	"	106MC	"	106MC	"	A20, A21	"
11.	"	"	90MC	"	90MC	"		If necessary compress or expand L1 & L3 for maximum deflection. Repeat steps 9 & 10 for proper RF tracking.

HUM BALANCE ADJUSTMENT

1. Allow 10 minute warmup period with record player disconnected.
2. Set function switch to phono.
3. Set volume control fully clockwise.
4. Reverse AC line plug. Leave in position that gives least hum.
5. Adjust hum balance control (R4A) for minimum hum.

FIG. 1

FIG. 2



CHASSIS TOP VIEW

PROPERTY OF
L. F. CLARKENSHIP
3070 MILADE ST
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	FM RF Amp.	6CB6	6CB6	7CM	
V2	FM Mixer	6BE6	6BE6	7CH	
V3	FM Osc. -AFC	6J6	6J6	7BF	
V4	AM RF Amp.	6BA6	6BA6	7BK	
V5	AM Converter	6BE6	6BE6	7CH	
V6	FM-AM IF Amp.	6BA6	6BA6	7BK	
V7	FM IF Amp.	6CB6	6CB6	7CM	
V8	1st FM Limiter	6AU6	6AU6	7BK	
V9	2nd FM Liviter	6AU6	6AU6	7BK	
V10	Discriminator	6AL5	6AL5	6BT	
V11	AM Det. -AVC-AF Amp.	6AT6	6AT6	7BT	
V12	AF Amp.	12AU7	12AU7	9A	
V13	Phono Pre-Amp.	12AX7	12AX7	9A	
V14	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ESPEY PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲40	450				FP376.8	TM-404010-450	T-165	
B	■40	450							
C	▲10	450							
C2A	■15	350							
B	▲15	350				FP345.5	TM-D15-400	D-155	
C	25	25							Note 1.
C3A	1500			D6-152	GP2L-152	UC-5215		C-1215	
B	1500			D6-152	GP2L-152	UC-5215		C-1215	
C	1500			D6-152	GP2L-152	UC-5215		C-1215	
C4	10000			DD-103	811-01	DC511			
C5	40			TCZ-39	NPOL-390				Note 2.
C6	1-8			829-7	532-10				
C7	51			TCZ-51	NPO-338-510	ZT-545			
C8	51			TCZ-51	NPO-338-510	ZT-545			
C9	1-8			829-7	532-10				
C10	10			TCZ-10	NPOA-100	ZT-5568			
C11	1500			D6-152	GP2L-152	UC-5215		C-1215	
C12	51			TCZ-51	NPO-338-510	ZT-547			
C13	10000			DD-103	811-01	DC511			
C14	1000			DD-102	801-001	DC521		K-1210	
C15	100			TCZ-100	NPO-337-101	ZT-531			
C16	10000			DD-103	811-01	DC511			
C17	10000			DD-103	811-01	DC511			
C18	10000			DD-103	811-01	DC511			
C19	10000			DD-103	811-01	DC511			
C20	470			DD-471	811-471	UC-5347		K-1347	
C21	470			DD-471	811-471	UC-5347		K-1347	
C22	10			TCN-10	N750A-100	NT-541			
C23	1500			D6-152	GP2L-152	UC-5215		C-1215	
C24A	10000			DD3-103	811-01	DC511			
B	10000				811-01	DC511			
C25	20000			DD-203	817-02				
C26	5			TCZ-4R7	NPOA-050				
C27	100			TCZ-100	NPO-337-101	ZT-531			
C28	20			TCZ-20	NPOK-200	ZT-542			
C29	10000			DD-103	811-01	DC511			
C30	.05	200		DF-503		PT415	IMP4-85	330415	
C31	20000			DD-203	817-02				
C32	5				NPOA-050	ZT-555			
C33	20000			DD-203	817-02				
C34	10000			DD-103	811-01	DC511			
C35	10000			DD-103	811-01	DC511			
C36	10000			DD-103	811-01	DC511			
C37	20000			DD-203	817-02				Note 3.
C38	10000			DD-103	811-01	DC511			
C39	10000			DD-103	811-01	DC511			
C40	10000			DD-103	811-01	DC511			
C41A	10000			DD3-103	811-01	DC511			
B	10000				811-01	DC511			

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R5	180Ω	½		BTS-180	Note 1
R6	22KΩ	1		BTA-22K	
R7	22KΩ	2		BTS-22K	
R8	150Ω	½		BTS-150	
R9	15KΩ	2		BTB-15K	
R10	470Ω	½		BTS-470	
R11	22KΩ	½		BTS-22K	
R12	22Ω	½		BTS-22	Note 2
R13	470Ω	½		BTS-470	
R14	4700Ω	2		BTB-4700	Note 3
R15	100Ω	½		BTS-100	
R16	100KΩ	½		BTS-100K	
R17	1MegΩ	½		BTS-1Meg	
R18	470KΩ	½		BTS-470K	
R19	100Ω	½		BTS-100	
R20	22KΩ	1		BTA-22K	
R21	22KΩ	½		BTS-22K	
R22	150Ω	½		BTS-150	
R23	100Ω	½		BTS-100	
R24	22KΩ	1		BTA-22K	
R25	100Ω	2			
R26	180Ω 5%	½		BTS-180 5%	
R27	22KΩ	1		BTA-22K	
R28	47KΩ	½		BTS-47K	
R29	510Ω 5%	½		BTS-510 5%	
R30	510Ω 5%	½		BTS-510 5%	
R31	22KΩ	½		BTS-22K	
R32	100KΩ	½		BTS-100K	
R33	47KΩ	½		BTS-47K	
R34	47KΩ	1		BTA-47K	Note 4
R35	220KΩ	½		BTS-220K	
R36	100KΩ	½		BTS-100K	
R37	47KΩ	1		BTA-47K	
R38	100KΩ	½		BTS-100K	
R39	100KΩ	½		BTS-100K	
R40	100KΩ	½		BTS-100K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R41	47KΩ	½	♦	BTS-47K	
R42	470KΩ	½		BTS-470K	
R43	2.2Meg 5%	½		BTS-2.2Meg 5%	
R44	2.2Meg 5%	½		BTS-2.2Meg 5%	
R45	2.2Meg	½		BTS-2.2Meg	
R46	2.2Meg	½		BTS-2.2Meg	
R47	220KΩ	½		BTS-220K	
R48	2.2Meg	½		BTS-2.2Meg	
R49	220KΩ	½		BTS-220K	
R50	1000Ω	½		BTS-1000	
R51	47KΩ	½		BTS-47K	
R52	470KΩ	½		BTS-470K	
R53	47KΩ	½		BTS-47K	
R54	1000Ω	½		BTS-1000	
R55	47KΩ	½		BTS-47K	
R56	22KΩ	½		BTS-22K	
R57	2700Ω	½		BTS-2700	
R58	220KΩ	½		BTS-220K	
R59	22KΩ	½		BTS-22K	
R60	10Meg	½		BTS-10Meg	
R61	100KΩ	½		BTS-100K	
R62	100KΩ	½		BTS-100K	
R63	47KΩ	½		BTS-47K	
R64	2Meg 5%	½		BTS-2Meg 5%	
R65	680KΩ5%	½		BTS-680K 5%	
R66	51KΩ 5%	½		BTS-51K 5%	
R67	100KΩ	½		BTS-100K	
R68	22KΩ	½		BTS-22K	
R69	22KΩ	½		BTS-22K	
R70	47KΩ	½		BTS-47K	Note 3
R71	22KΩ	½		BTS-22K	
R72	150KΩ	½		BTS-150K	

♦ Items R41, C51A, C51B are combined in one unit.
Note 1. Some versions use a 150Ω resistor in this application.
Note 2. Not used in some versions.
Note 3. Some versions use a 10KΩ 2 watt resistor in this application.
Note 4. Some versions use a 5IKΩ 2 watt resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	RATING: SEC. 4	REPLACEMENT DATA: ESPEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .74A	600VCT .093ADC	5VAC @ 2A	6.3VAC @ .85A	6.3VAC @ 2.4A	B18.127					

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM ant. coil	0Ω						Tapped
L2	Fil. choke	.3Ω			19-1001		4604	1.5UH
L3	RF choke	.9Ω			19-1003		4608	3UH
L4	FM RF coil	0Ω						Tapped
L5	RF choke	.9Ω			19-1003		4608	3UH
L6	FM Osc. coil	0Ω	0Ω					
L7	Fil. choke	.3Ω			19-1001		4604	1.5UH
L8	RF choke	2.2Ω			19-1003		4605	3UH
L9	AM ant. coil	.3Ω						
L10	AM RF coil	90Ω	2.2Ω			BC-388		
L11	AM Osc. coil	.8Ω	6.7Ω		14-1074	BC-394	71-Osc.*	
L12	1st FM IF	.7Ω	.7Ω	2.754	16-3487	FM-254	1463	
L13	1st AM IF	9.5Ω	9.5Ω	2.414	16-6758	BC-352	12-C1	
L14	Fil. choke	.1Ω			19-1001		4604	1.5UH

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ESPEY PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C42	51			TCZ-51	NPO-338-510	ZT-545			
C43A	10000			DD3-103	811-01	DC511			
B	10000				811-01	DC511			
C44	100	500		TCZ-100	NPO-337-101	MCB235		KR-1310	
C45A	10000			DD3-103	811-01	DC511			
B	10000				811-01	DC511			
C46A	10000			DD3-103	811-01	DC511			Note 4.
B	10000				811-01	DC511			Note 4.
C47	20			TCZ-20	NPOK-200	ZT-542			
C48	100			TCZ-100	NPO-337-101	ZT-531			
C49	670	500						K-1368	
C50	20000			DD-203	817-02	PT412	IMP4-S2	330412	
C51A	100		♦	♦PC-50	♦1403-01	UC-531		K-1310	
B	100					UC-531		K-1310	
C52	20000			DD-203	817-02		IMP4-S2	330412	
C53	.05	400		DF-503		PT415	IMP4-S5	330415	
C54	20000			DD-203	817-02		IMP4-S2	330412	
C55	470			DD-471	811-471	UC-5347		K-1347	Note 3.
C56	51			TCZ-51	NPO-338-510	ZT-545			
C57	470			DD-471	811-471	UC-5347		K-1347	
C58	.03	400		DF-303		PT413	IMP4-S3	330413	
C59	1000			DD-102	801-001	DC521	IMP6-D1	K-1210	
C60	10000			DD-103	811-01	DC511	IMP4-S1	330411	
C61	.1	400		DF-104		PT401	IMP4-P1	330401	
C62	1500			D6-152	GP2L-152	UC-5215	IMP6-D15	C-1215	
C63	820	500						KR-1382	
C64	820	500						KR-1382	
C65	.03	400		DF-303		PT413	IMP4-S3	330413	
C66	.1	400		DF-104		PT401	IMP4-P1	330401	
C67	3900	500				MCB463		CR-1239	
C68	10000			DD-103		DC511	IMP4-S1	330411	
C69	10000			DD-103		DC511	IMP4-S1	330411	
C70	250	500				MC240		K-1325	
C71	50000	500		DF-503		PT415	IMP4-S5	330415	

♦ Items C51A, C51B, and R41 are combined in one unit.
Note 1. Section C2C not used.
Note 2. Some versions may use a 51MMF capacitor in this application.
Note 3. Some versions may use a 10000MMF capacitor in this application.
Note 4. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ESPEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	A9.128	Q13-137	A47-1Meg-Z	B-70-S	U-53	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A
R2A	1Meg	½	A9.129	Q13-137	A47-1Meg-Z	B-69	U-53	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	Switch		B9.311-A					Equalizer (Panel)
B	500KΩ	½	Not Req.					Volume (Rear)
R4A	100Ω	2	A9.310-A	W100	A43-100	VK-121	R100L	Hum Balance (Wire Wound)
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L15	2nd FM IF	.7Ω	.7Ω	2.754	16-3487	FM-254	1463	
L16	2nd AM IF	9.5Ω	9.5Ω	2.414	16-6758	BC-353	12-C2	
L17	3rd FM IF	.7Ω	.7Ω	2.754	16-3487	FM-254	1463	
L18	Fil. choke	.1Ω			19-1001		4604	1.5UH
L19	FM Limiter	.7Ω		2.755	16-3487■	FM-254■	1463■	
L20	Fil. choke	.3Ω			19-1001		4604	1.5UH
L21	Discriminator	.7Ω	.8ΩCT	2.756	17-3494	FM-253	1464	
L22	RF coil	.4Ω			19-1001		4604	1.2UH
L23	Fil. choke	.3Ω			19-1001		4604	1.5UH
L24A	Line choke	0Ω						
B	Line choke	0Ω						

* Drill mounting hole.
■ Use ① winding only.

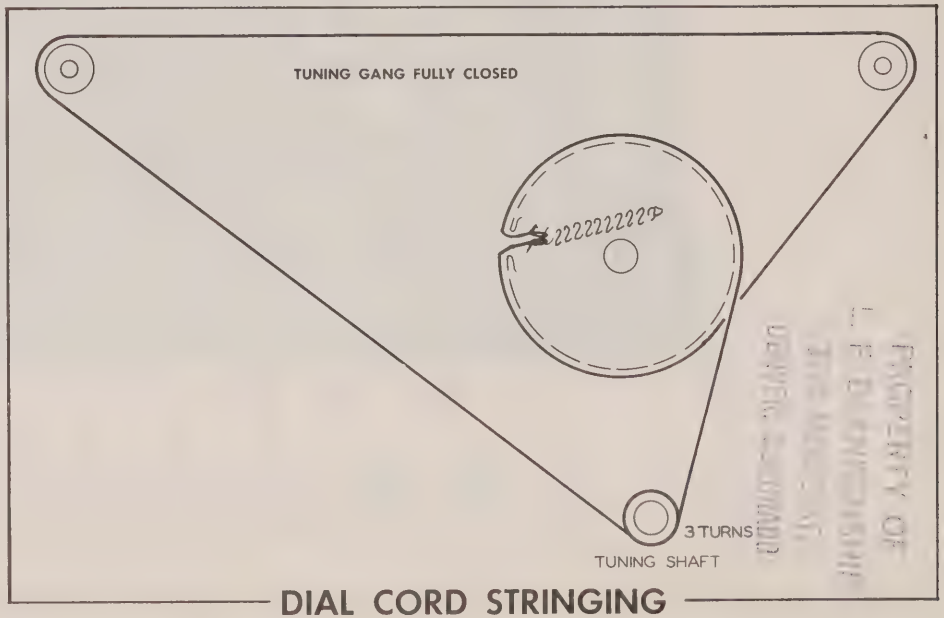
FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA ESPEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L25	.093A	276Ω	10.2Hy	B16.353			C-1709①	20C53①	

① Drill on new mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	ESPEY PART No.	NOTES
M1	Dial Light		#47
M2	Dial Light		#47
M3	Tuning Cap.	B6-070	6 Gang (AM Sections 30-535MMF, 30-535MMF, 30-535MMF)
M4	Switch		Selector (Rotary-Wafer Type)
A6	Trimmer Cap.	C13518	AM Osc. Padder



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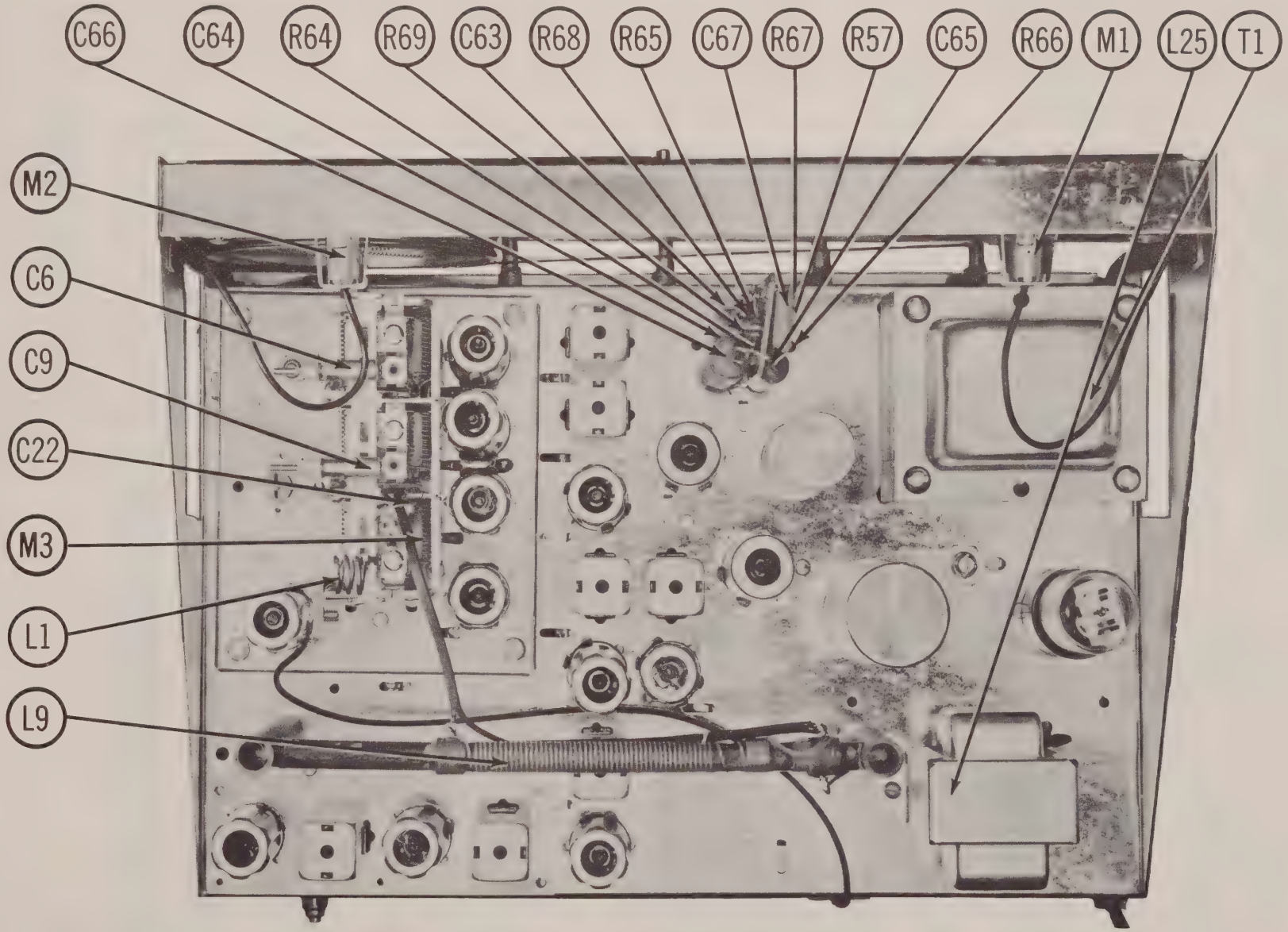
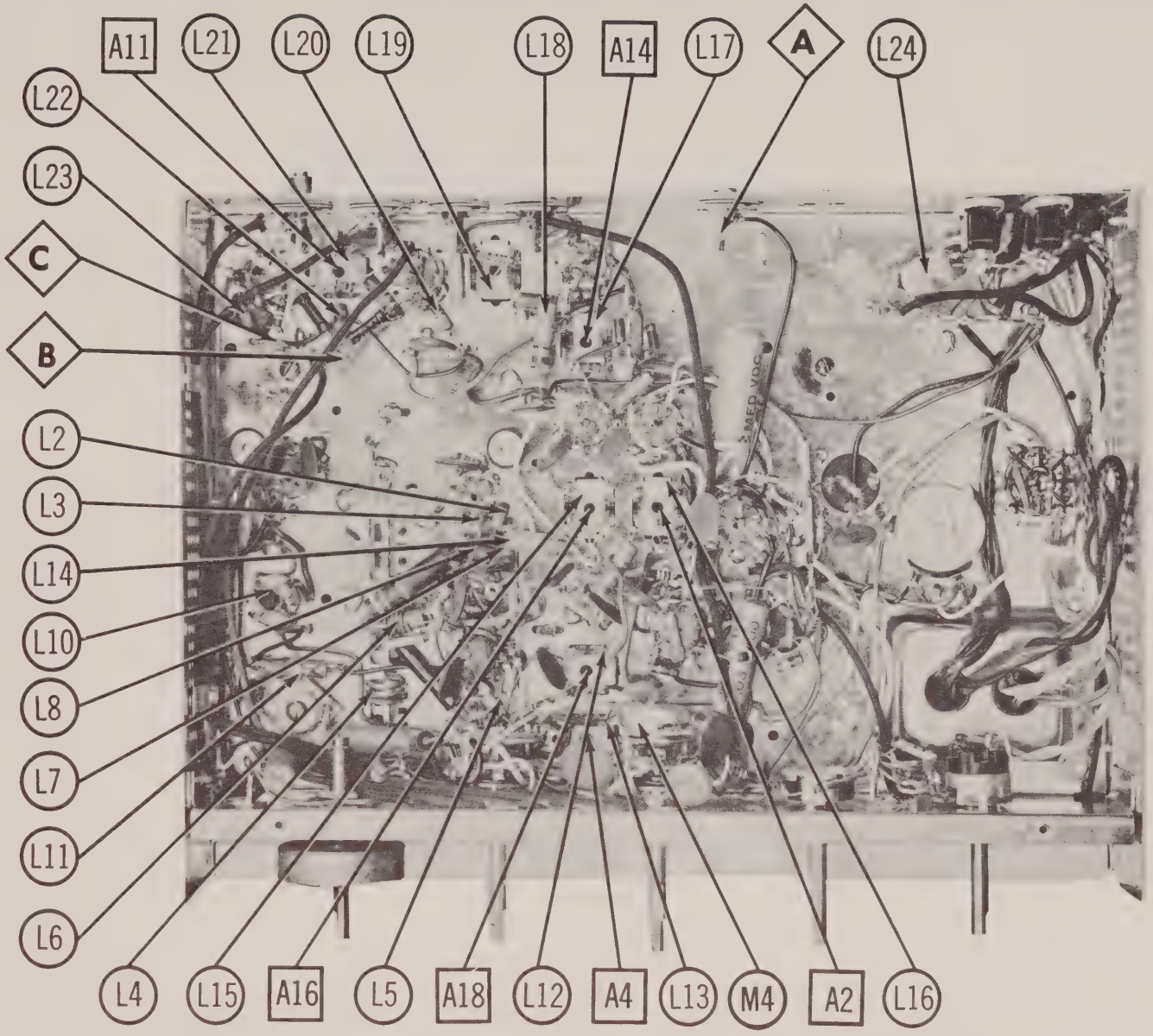


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW INDUCTOR AND ALIGNMENT IDENTIFICATION

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PHOTOFACT* Folder

MAGNAVOX MODELS CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series)

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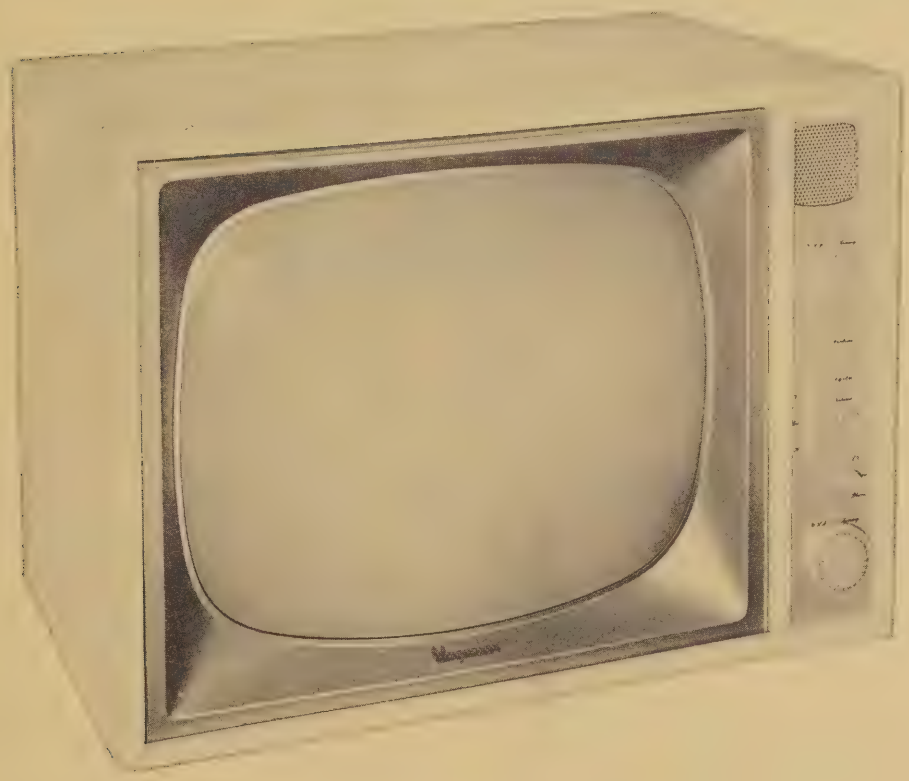

MAGNAVOX MODELS CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series)

CHASSIS CMUA456AA

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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DATE 10–55 SET 291 FOLDER 8

PHOTOFACT* Folder
*TRADE MARK

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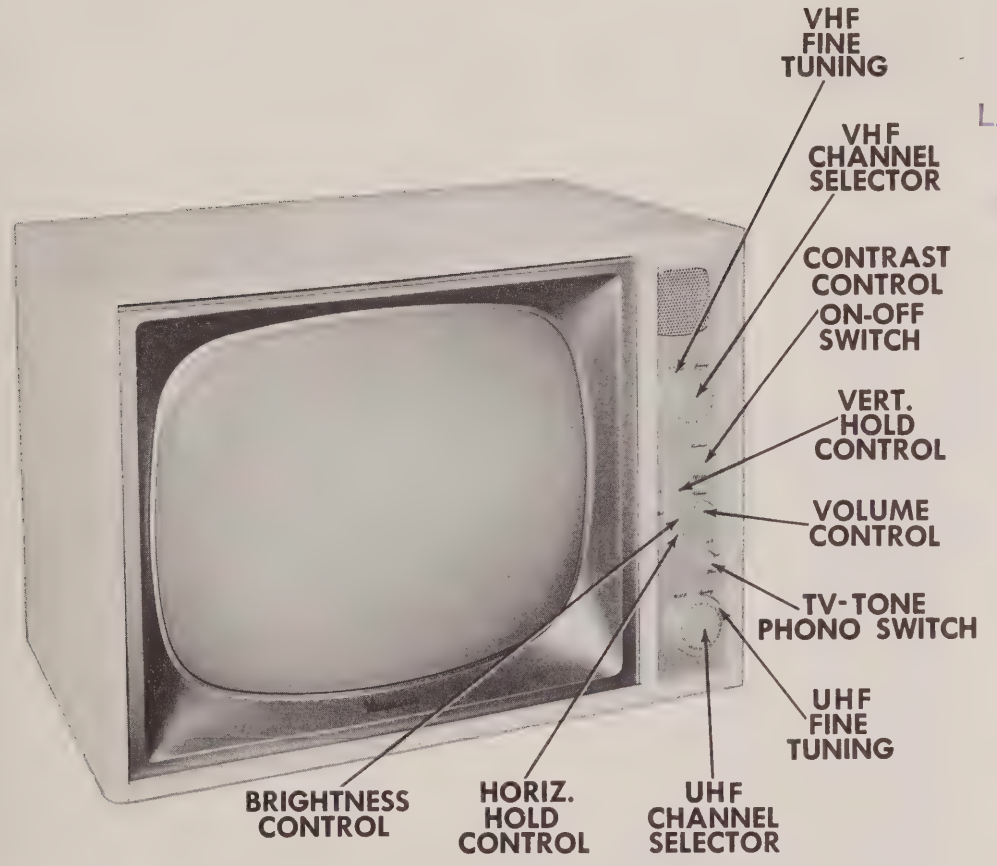

MAGNAVOX CHASSIS CMUA456AA

TRADE NAME	Magnavox Chassis CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series)
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	Television Receiver
TUBES	Twenty-two
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.8 Amp. @ 117 Volts
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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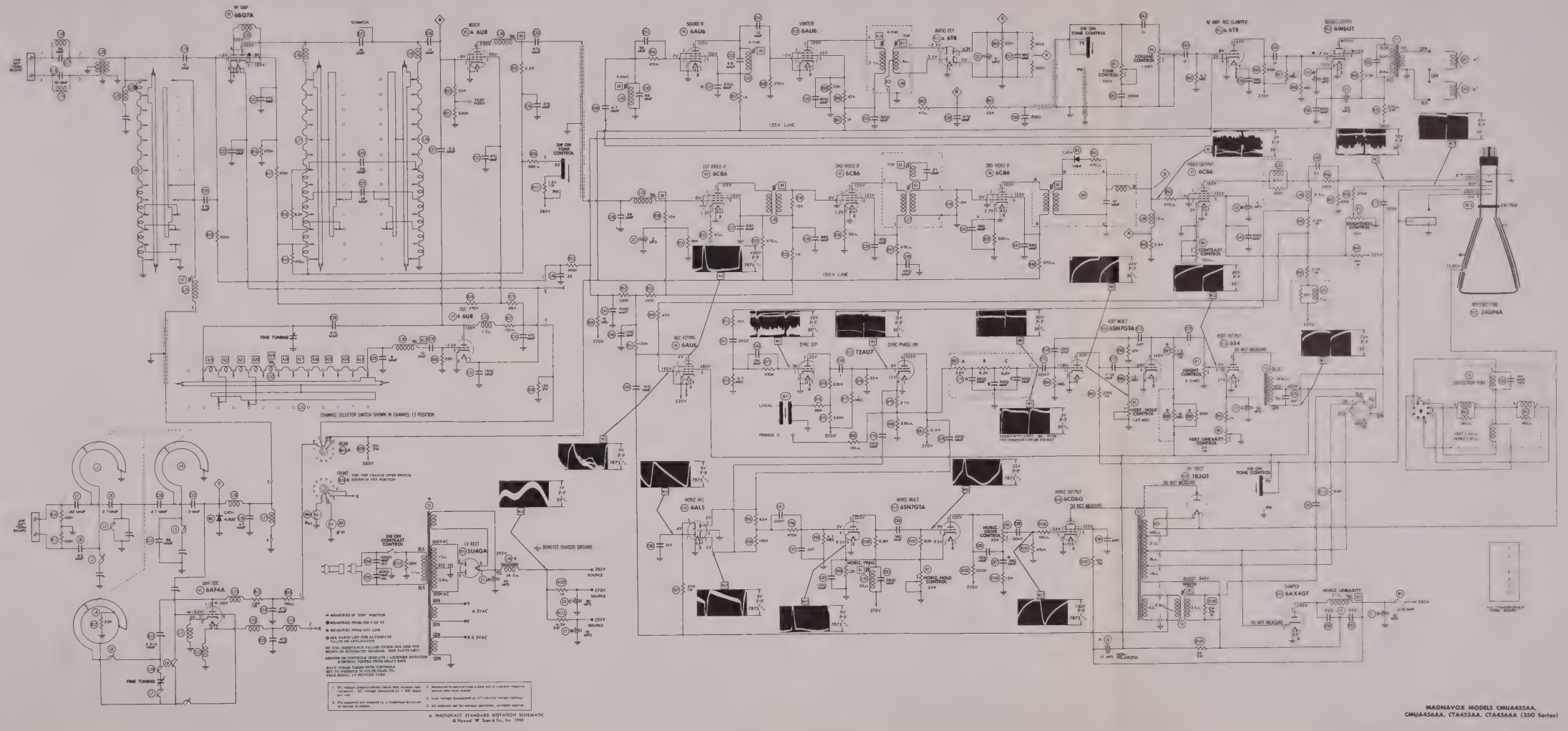
MAGNAVOX MODELS CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series)


MAGNAVOX MODELS CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series)
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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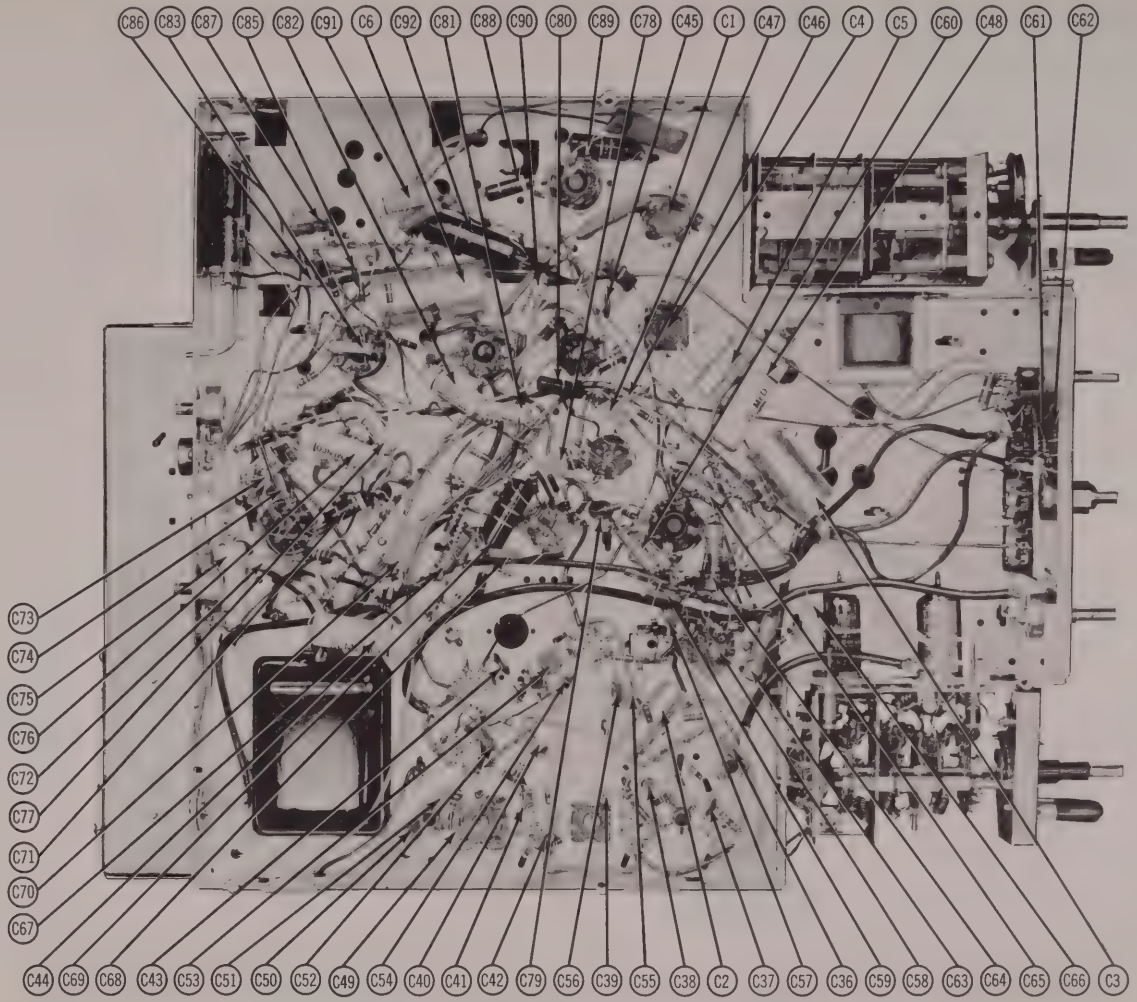
DENOTES CHASSIS GROUND
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
FINE TUNING
SW ON CONTRAST CONTROL
SW ON TONE CONTROL
135V LINE
285V SOURCE
370V SOURCE
225V SOURCE
6.3VAC
300VAC
RF AMP 6BQ7A
MIXER 6U8
OSC 6U8
VHF OSC 6AF4A
SOUND IF 6AU6
LIMITER 6AU6
RATIO DET 6T8
AF AMP AGC CLAMPER 6T8
AUDIO OUTPUT 6W6GT
1ST VIDEO IF 6CB6
2ND VIDEO IF 6CB6
3RD VIDEO IF 6CB6
VIDEO OUTPUT 6CB6
AGC KEYING 6AU6
SYNC SEP 12AU7
SYNC PHASE INV 12AU7
VERT MULT 6SN7GTA
VERT OUTPUT 6S4
HORIZ AFC 6AL5
HORIZ MULT 6SN7GTA
HORIZ OUTPUT 6CD6G
HV RECT 1B3GT
HV RECT 5U4GA
DAMPER 6AX4GT
24DP4A
VOLUME CONTROL
TONE CONTROL
BRIGHTNESS CONTROL
CONTRAST CONTROL
VERT HOLD CONTROL
VERT LINEARITY CONTROL
HEIGHT CONTROL
HORIZ DRIVE CONTROL
HORIZ HOLD CONTROL
HORIZ FREQ
BOOST 540V
HORIZ LINEARITY
DEFLECTION YOKE
DO NOT MEASURE
FRONT VHF-UHF CHANGE-OVER SWITCH SHOWN IN VHF POSITION
FINE TUNING
LOCAL
FRINGE
AGC TAKE-OFF
TEST POINT
CRT
CRT SOCKET
TRANSFORMER TUNING BOARD
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are numbered in a clockwise direction as indicated by arrows.
3. Measured resistance from socket pin to chassis ground unless otherwise noted.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

CHASSIS TOP VIEW

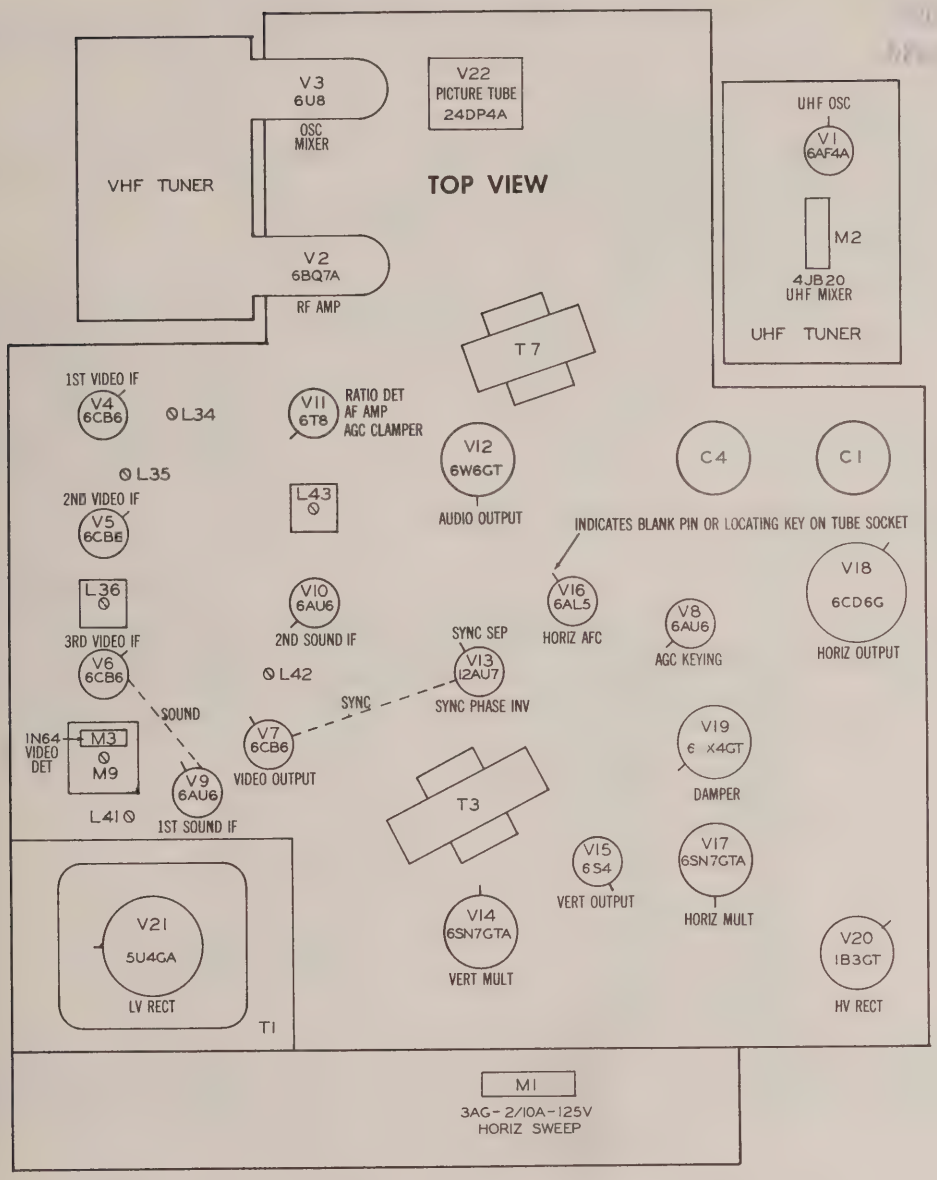
MAGNAVOX MODELS CMUA455AA,
CMUA456AA, CTA455AA, CTA456AA (350 Series)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V12 (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V7, V8, V22
Has pic, no sound - V9, V10, V11, V12
Overloaded picture - V8, V11

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V13, V16, V17
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V22, Fuse (M1)
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, V21
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V16, V17

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be scurely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V17) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C48.
Connect the positive lead to chassis.
Connect the negative lead of a 3 volt battery to the ungrounded side of C5.
Connect the positive lead to chassis. A signal 4.5 volt battery with -1.5 volts and -3 volts taps may be used if available.
In step 1 it is possible to obtain two settings of A1 at which maximum attenuation will occur. Correct adjustment will be indicated when 47.25MC marker is centered in the trap and the core is farthest out of the coil.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	43.0MC (10MC Swp)	47.25MC	Any unused high band channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1	Couple a second signal generator to point Ⓑ to provide markers. Adjust to center 47.25MC marker in trap notch as in Fig.1. Use enough sweep output so that trap notch is visible on scope.
2.	"	"	"	42.75MC 45.0MC 45.75MC 47.25MC	"	"	A2, A3, A4	Attenuate sweep generator output for 2 volts peak to peak on scope. Adjust for response similar to Fig. 1. Adjust A2 for maximum gain and MINIMUM tilt. A3 positions 45.75MC marker. A4 positions 42.75MC marker. Recheck A1 adjustment for correct 47.25MC trap position. See Fig. 1.
3.	"	High side to point Ⓑ. Low side to chassis.	"	"	"	"	A5, A6	Adjust A5 for maximum gain and to place 45.75MC at 50% on response curve as in Fig. 2. Adjust A6 for maximum amplitude and correct tilt. Repeat adjustments of A5 and A6 (if necessary) several times to obtain response within limits in Fig. 2.
4.	Fig. 3	Thru matching network (Fig.3) to VHF antenna terminals.	213MC (10MC Swp)	42.75MC 45.0MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Couple marker generator loosely to pin 1 (grid) of 6CB6 (V4). Check for response similar to Fig. 2 on all VHF channels. Response should be within limits shown by dotted lines. If necessary, repeat steps 1 thru 4.
			207MC (10MC Swp)	45.75MC 47.25MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
5.	1000Ω Carbon Resistor	High side to point Ⓒ thru 1000Ω. Low side to chassis.	43MC (10MC Swp)	45.75MC	UHF	"	A7	Turn tuner to UHF position. Adjust A7 to place 45.75MC marker at 50% on high frequency slope of response curve, (Fig.2).

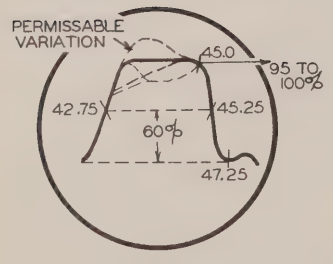


FIG. 1

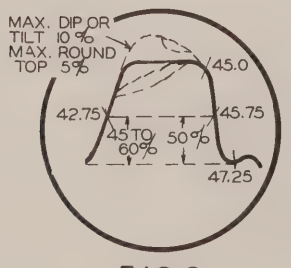


FIG. 2

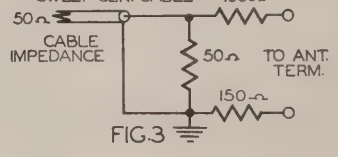


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓔ to chassis. The junction of these two resistors is alignment point Ⓕ as shown on the schematic.
Remove V6 (6CB6) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.005MFD	High side to point Ⓓ. Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru 100KΩ to point Ⓔ. Common to chassis.	A8, A9, A10	Attenuate generator output to maintain 6.5 to 7 volts at VTVM. Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point Ⓖ. Common to point Ⓕ.	A-11	Temporarily short out pin 1 (grid) of 6AU8 (V10) to chassis. Adjust VTVM for zero, then remove short from pin 1 of V10. Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 6 and 7. Replace V6 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Remove 6CB6 (V6) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.005MFD	High side to point Ⓓ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10KΩ to point Ⓔ. Low side to chassis.	A8, A9, A10	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
7.	"	"	"	"	"	Vert. Amp. thru 10KΩ to point Ⓖ. Low side to chassis.	A-11	Reconnect stabilizing capacitor C2. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 5. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. Replace V6 in its socket.

VHF OSCILLATOR ALIGNMENT

Loosely couple an RF signal generator to the grid of the first IF amplifier tube (V4) and tune it accurately to 45.75MC.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 3	Thru matching network (Fig. 3) to antenna terminals.	213MC (10MC Swp)	211.25MC 45.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A12	Adjust so that video RF and video IF markers coincide on response curve.
9.	"	"	207MC (10MC Swp)	205.25MC 45.75MC	12	"	A13	Adjust position of loops so that video RF and video IF markers coincide on response curve.
			201MC (10MC Swp)	199.25MC 45.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 45.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 45.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 45.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 45.75MC	7		A18	
10.	"	"	85MC (10MC Swp)	83.25MC 45.75MC	6	"	A19	Adjust so that video RF and video IF markers coincide on response curve.
11.	"	"	79MC (10MC Swp)	77.25MC 45.75MC	5	"	A20	Adjust (compress or expand coil turns) so that video RF and video IF markers coincide on response curve.
			69MC (10MC Swp)	67.25MC 45.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 45.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 45.75MC	2		A23	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

The UHF tuner has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

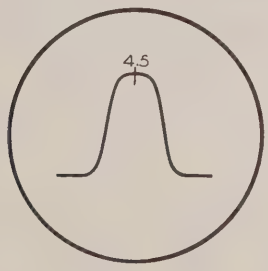


FIG. 4

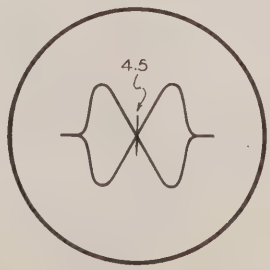
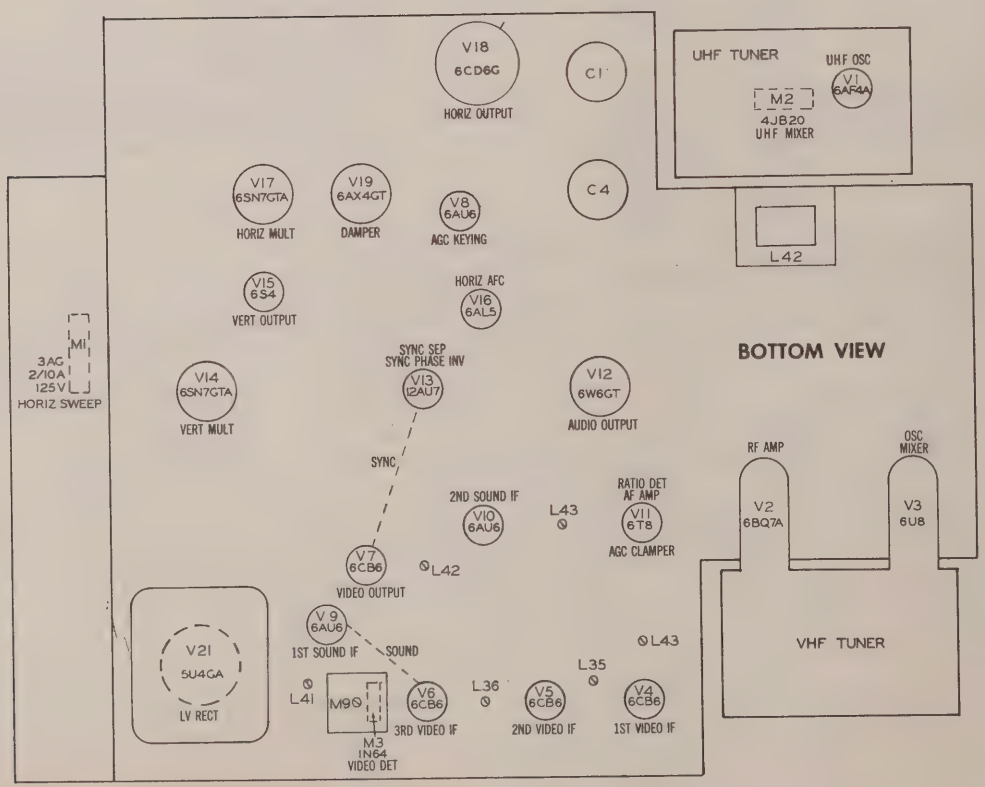


FIG. 5

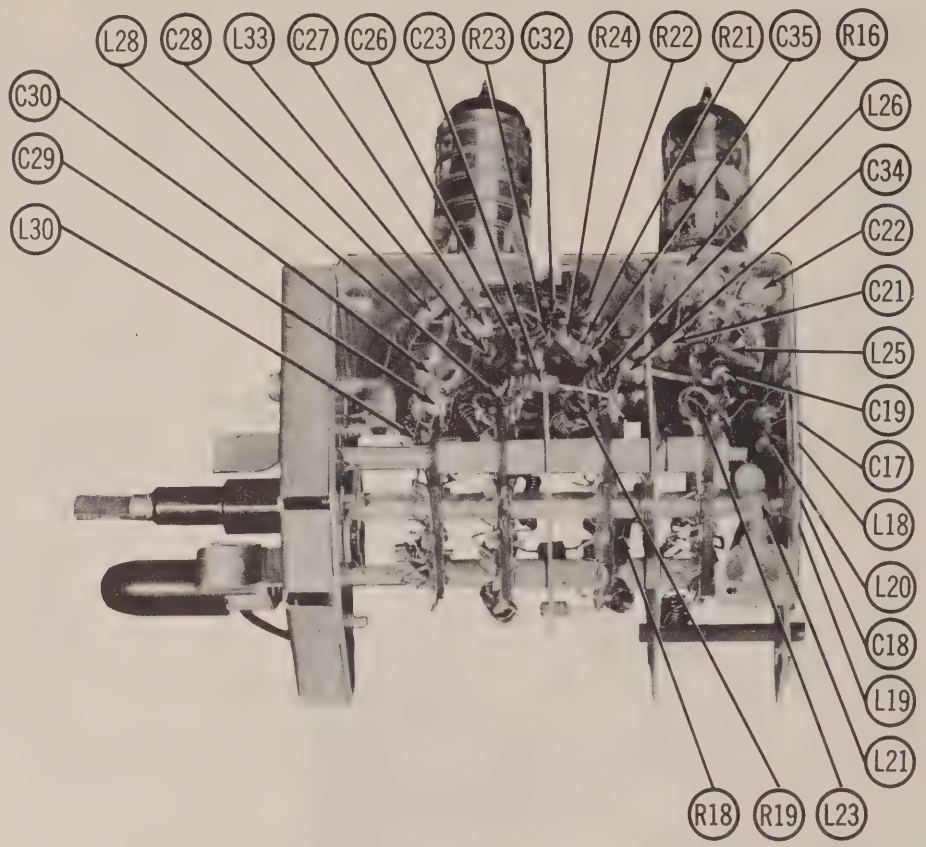
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4A	*■L. 3KΩ	22KΩ	. 1Ω	0Ω	0Ω	22KΩ	*■l. 3KΩ		
V 2	6BQ7A	†L. 9KΩ	260KΩ	Inf.	0Ω	. 1Ω	Inf.	1Meg	0Ω	0Ω
V 3	6U8	■150Ω	360KΩ	■68KΩ	0Ω	. 1Ω	†5. 2KΩ	0Ω	0Ω	22KΩ
V 4	6CB6	70KΩ	47Ω	. 1Ω	0Ω	■500Ω	■500Ω	0Ω		
V 5	6CB6	60KΩ	56Ω	. 1Ω	0Ω	■500Ω	■500Ω	0Ω		
V 6	6CB6	. 1Ω	220Ω	. 1Ω	0Ω	■500Ω	■500Ω	0Ω		
V 7	6CB6	6KΩ	100Ω	. 1Ω	0Ω	†10KΩ	†20KΩ	0Ω		
V 8	6AU6	†50KΩ	†4. 3KΩ	†4. 3KΩ	†4. 3KΩ	250KΩ	▲3KΩ	†4. 3KΩ		
V 9	6AU6	470KΩ	0Ω	. 1Ω	0Ω	■1KΩ	■1KΩ	0Ω		
V 10	6AU6	270KΩ	0Ω	. 1Ω	0Ω	■1KΩ	■25KΩ	0Ω		
V 11	6T8	Inf.	22KΩ	Inf.	. 1Ω	0Ω	500KΩ	0Ω	4. 7Meg	†470KΩ
V 12	6W6GT	TP	0Ω	†500Ω	†3. 6KΩ	550KΩ	NC	. 1Ω	11KΩ	
V 13	12AU7	†400KΩ	5Meg	0Ω	0Ω	0Ω	†3. 4KΩ	22KΩ	3KΩ	. 1Ω
V 14	6SN7GTA	1Meg	▲270KΩ	0Ω	2Meg	▲1. 2Meg	0Ω	. 1Ω	0Ω	
V 15	6S4	NC	2. 1KΩ	1. 8Meg	. 1Ω	0Ω	1. 8Meg	NC	NC	▲4. 5KΩ
V 16	6AL5	5Meg	5Meg	. 1Ω	0Ω	27KΩ	0Ω	27KΩ		
V 17	6SN7GTA	87KΩ	†200KΩ	1. 5KΩ	4. 7Meg	†8KΩ	1. 5KΩ	. 1Ω	0Ω	
V 18	6CD6G	NC	0Ω	0Ω	NC	470KΩ	TP	. 1Ω	†10KΩ	TOP CAP ▲21Ω
V 19	6AX4GT	TP	NC	Inf.	TP	†75Ω	TP	. 1Ω	0Ω	
V 20	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲470Ω
V 21	5U4GA	Inf.	20KΩ	Inf.	17Ω	Inf.	15Ω	Inf.	20KΩ	
V 22	24DP4A	0Ω	†300KΩ	PIN 6 0Ω	PIN 10 ▲3KΩ	PIN 11 †210KΩ	PIN 12 . 1Ω			

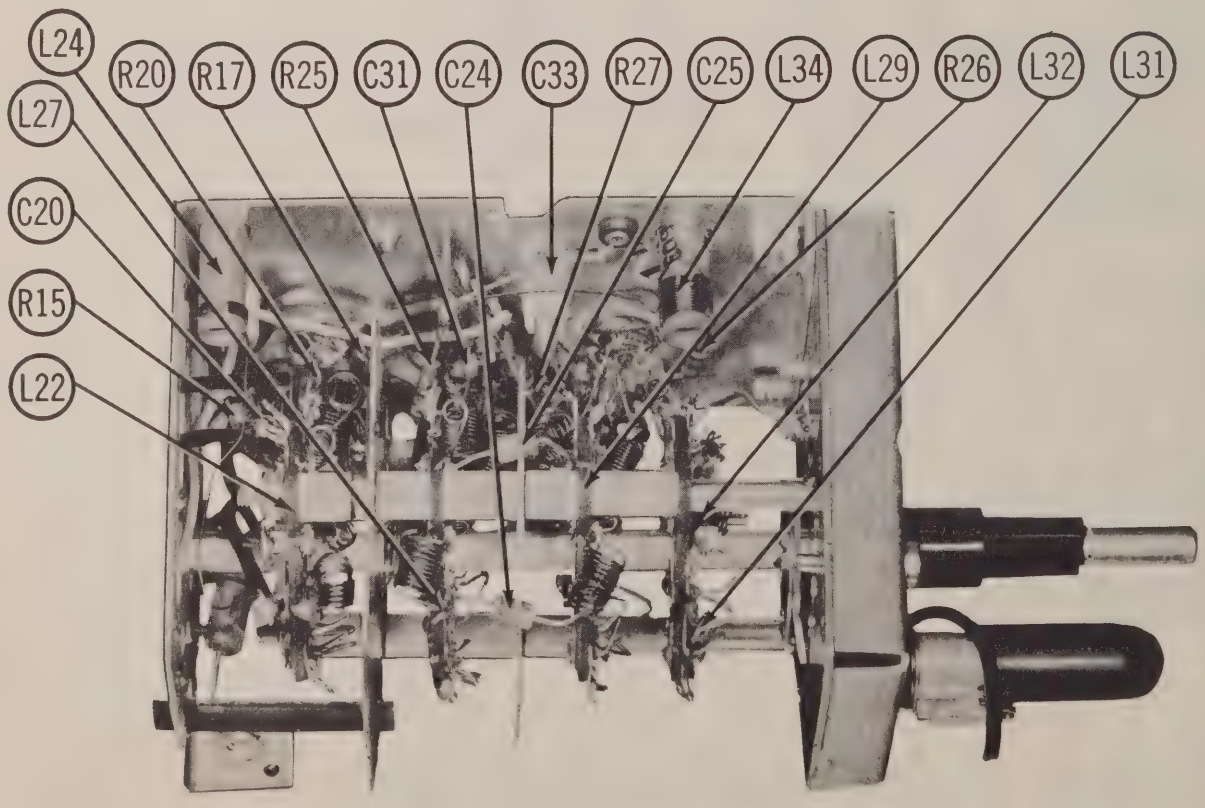
*MEASURED IN "UHF" POSITION
■MEASURED FROM 135V LINE.
▲MEASURED FROM PIN 3 OF V19.
†MEASURED FROM PIN 2 OF V21.
NC-NO CONNECTION.
TP-TIE POINT.



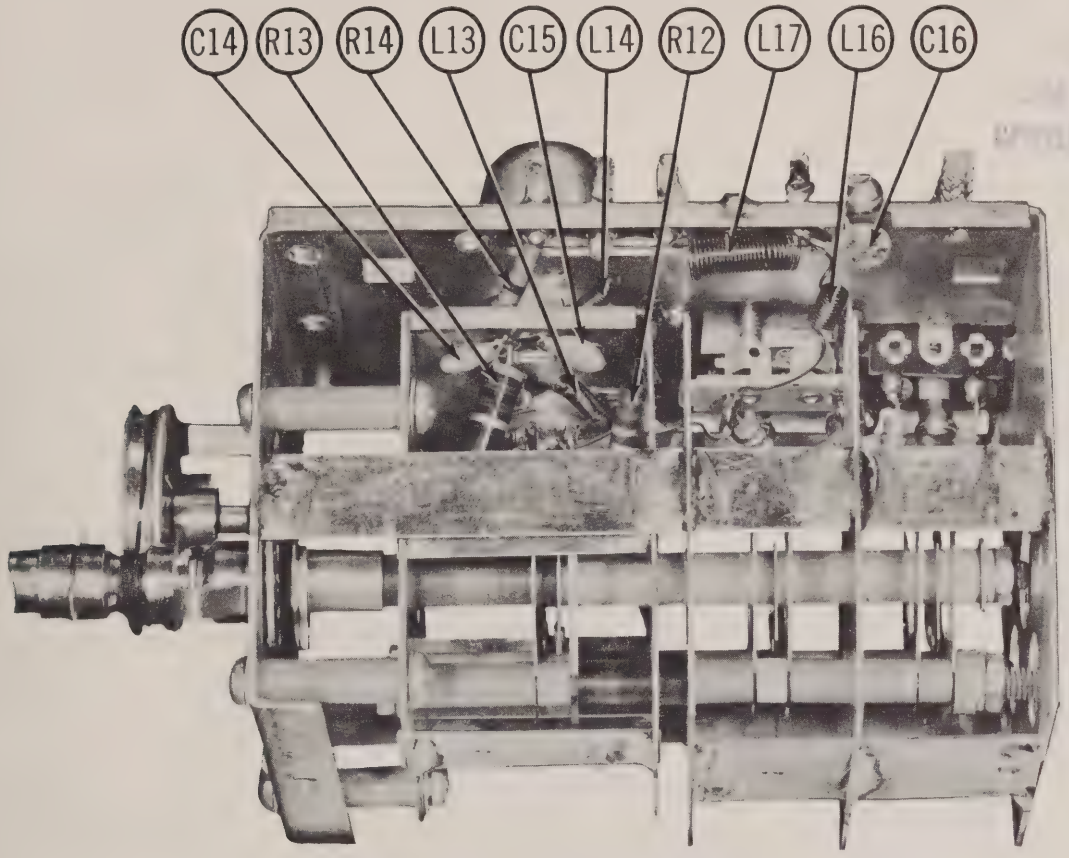
TUBE PLACEMENT CHART



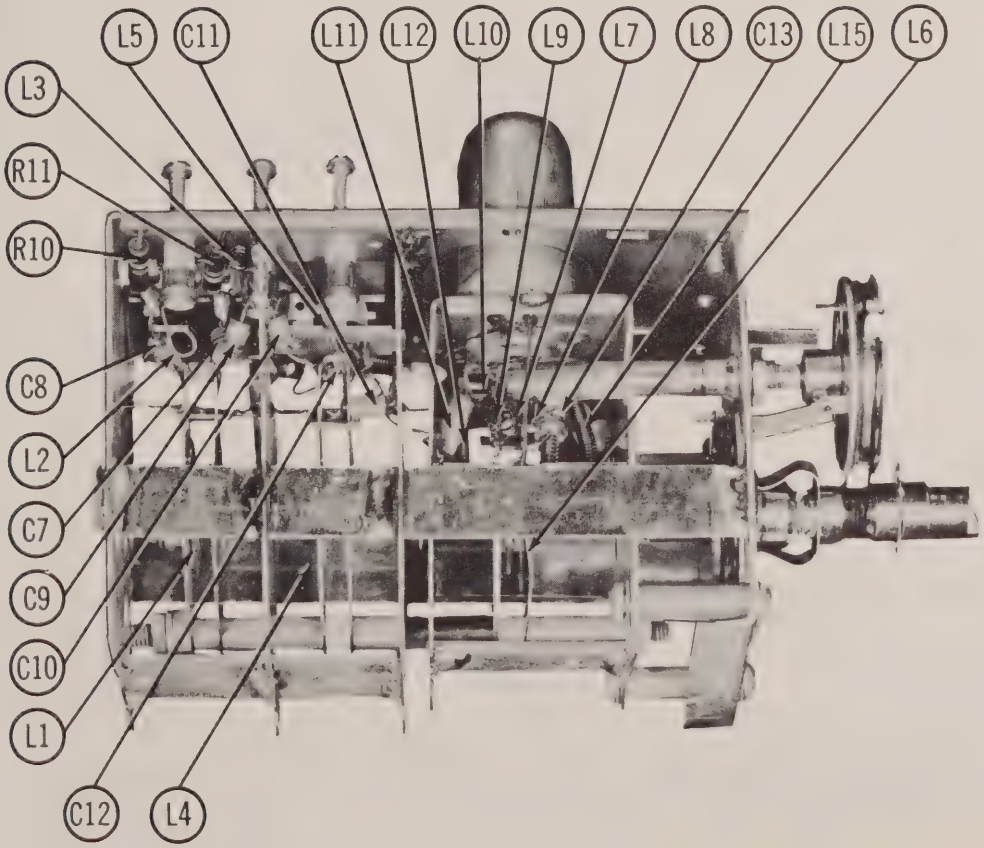
VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE



UHF TUNER-RIGHT SIDE



UHF TUNER-LEFT SIDE

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V18, V19 and V21. Check adjustments B2, B3 and R9. Check C86, C88, C87, R104, R107, T2, T4A and other associated components.

DRIVE LINES

Check by substitution V18 and V19. Check adjustments B3 and R9. Check C88, R107 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V18 and V19. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V17, V18 and V19. Check C82 for open. Check L44, C81, R96 and other associated components.

XMAS TREE EFFECT

Check by substitution V17, V18 and V19. Check T2 and T4 for internal arcing. Check C80, C85, C83, R99, R97, L44 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C76, C1C, R91 and other associated components.	Check C71, C72, C75, R109, R85, R86, R87 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V14 and V15. Check height and vertical linearity controls for proper operation. Check R85, R87, T3 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check R85, R87, R109, C72, C75 and other associated components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check R91, R8, C1C, T3 and other associated components.

FOLDS

Check by substitution V14 and V15. Check C73, C75, R90, T3, T4B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V13. Check C67, C68, C69, R74, R75, R81 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check vertical integrator network. Check R85, R86, R5, C71 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V16 and V17. Check C78, C79, C81, C82, C85, R101, R96 and other associated components.

HORIZONTAL BENDING

Check by substitution V13, V16 and V17. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V7. Check R44, R45, R50, L39, C44 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Substitute V7. Check contrast control. Check L38, L40, R46, C44 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check R46, L38, C44 and other associated components.

SMEAR

Substitute V7. Check L37, L38, L40, R44, R46, C44 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V2, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10, V11 and V12. Check stages V11 and V12 using audio signal generator. Apply audio signal across R4.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C62, C63, C64, C65, C3, R70, R69, R66, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A11 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V21. Check B+ filter and decoupling network.

SMALL AND/ON DIM PICTURE

Substitute V21. Check B+ filter and decoupling network.

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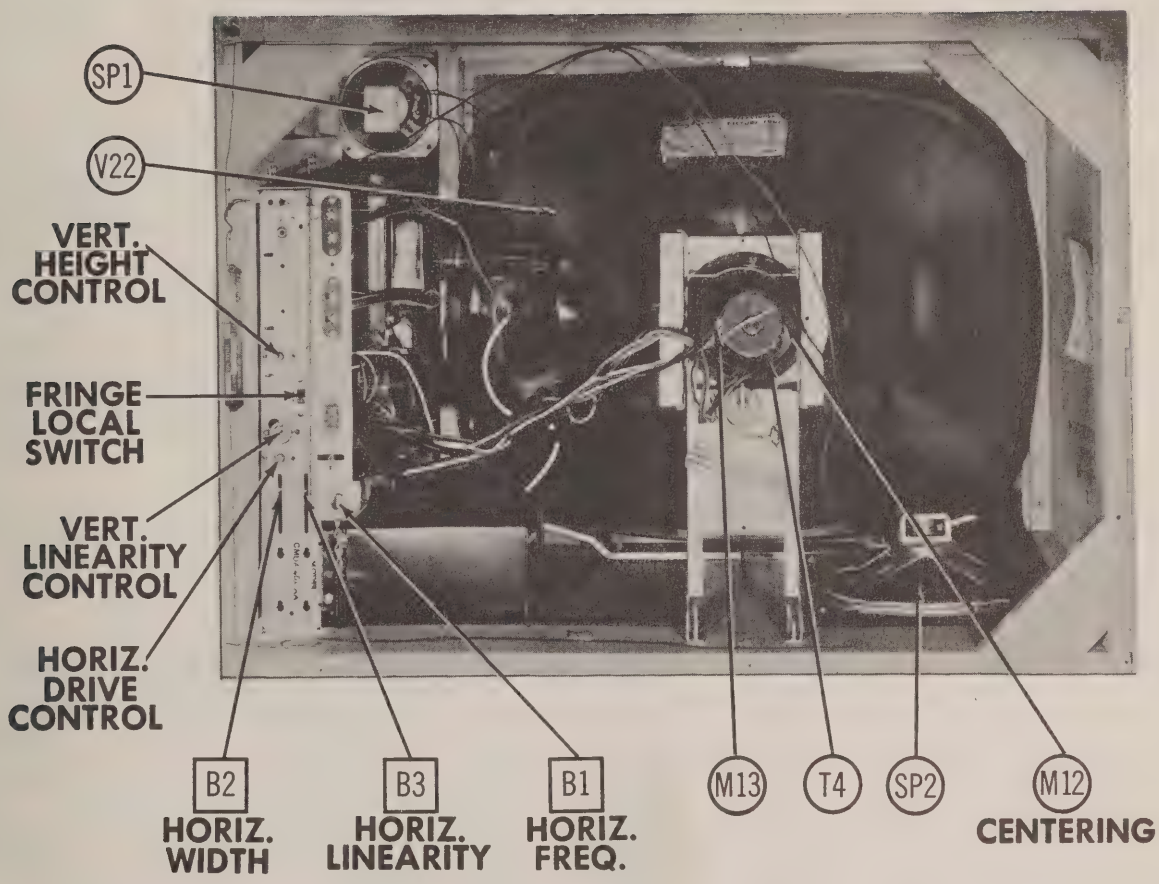
L. E. [illegible]SHIP
DENVER COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position.

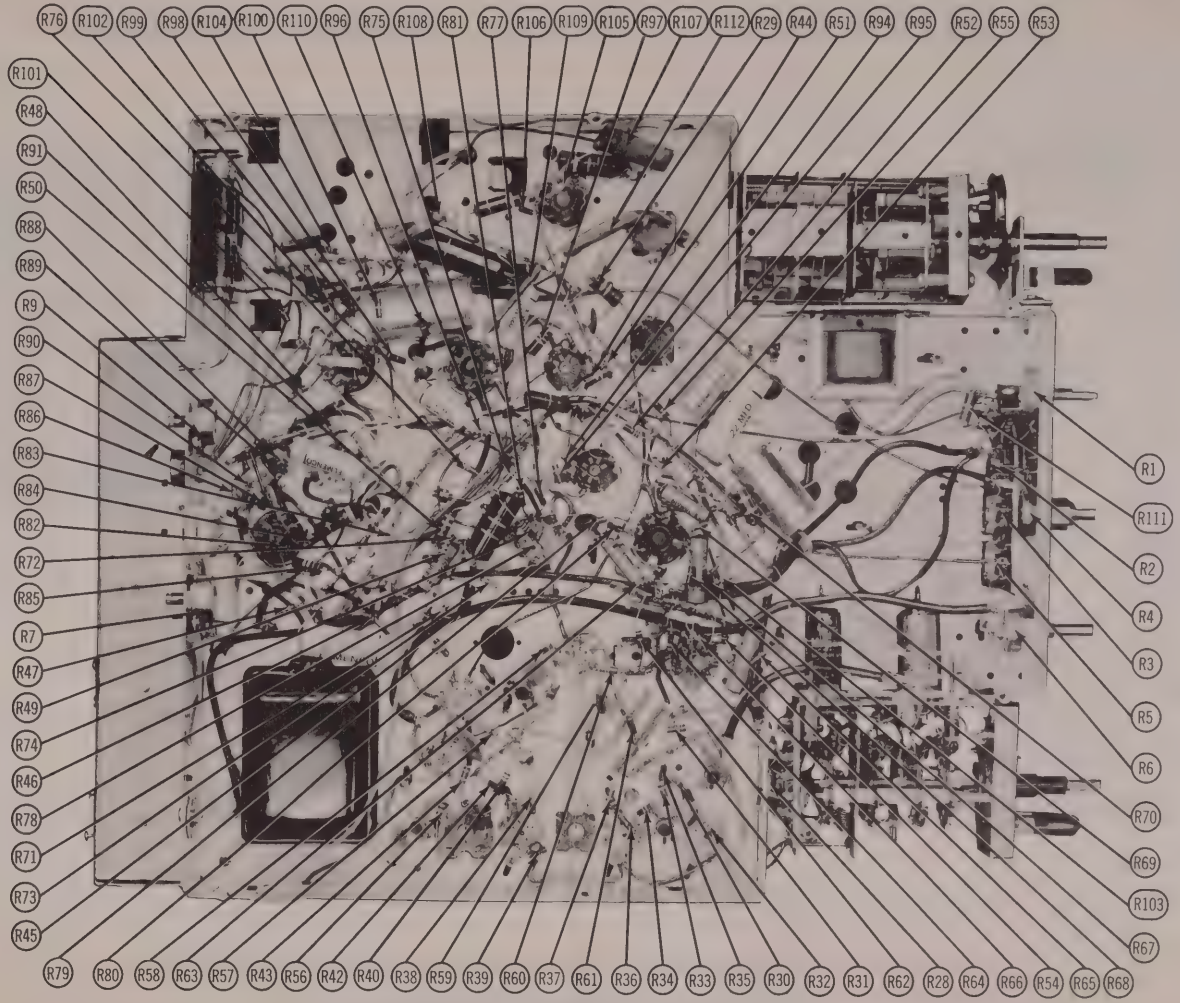
Turn the horizontal frequency slug (B1) slowly clockwise while switching on and off channel until picture just loses sync. Turn B1 counter clockwise until picture just pulls into sync, then turn B1 an additional half turn counter clockwise. The picture should hold sync at both extreme ends of the horizontal hold control.

If necessary, readjust B1 slightly and test for sync or pull in as above.

Adjust the horizontal drive control in a clockwise direction as far as possible without the presence of white vertical lines or compression near the center of the picture.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3001 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MAGNAVOX PART No.	STANDARD REPLACEMENT		
V1	UHF Osc.	6AF4A	6AF4A	7DK	
V2	RF Amp.	6BQ7A	6BQ7A	9AJ	
V3	VHF Mixer-Osc.	6U8	6U8	9AE	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Output	6CB6	6CB6	7CM	
V8	AGC Keying	6AU6	6AU6	7BK	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Limiter	6AU6	6AU6	7BK	
V11	Ratio Det. - AF Amp. - AGC Clamper	6T8	6T8	9E	
V12	Audio Output	6W6GT	6W6GT	7S	
V13	Sync Sep. - Sync Phase Inv.	12AU7	12AU7	9A	
V14	Vert. Mult.	6SN7GTA	6SN7GTA	8BD	
V15	Vert. Output	6S4	6S4	9AC	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V18	Horiz. Output	6CD6G	6CD6G	5BT	
V19	Damper	6AX4GT	6AX4GT	4CG	
V20	HV Rect.	1B3GT	1B3GT	3C	
V21	LV Rect.	5U4GA	5U4GA	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	MAGNAVOX PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V22	24DP4A①	24DP4A①	24DP4A①	24DP4A② 24DP4	24DP4A① 24DP4	12L 12L	① Aluminized ② Silver Screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	MAGNAVOX PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■40	350	270021-52			FP385.5	TM-4084	Q-222	
B	▲10	350				TC39	TD-40-350		
C	50	50							
D	▲70	350							
C2	4	50	270027-10			TC30	TD-4-50	MMT-0505	
C3	20	350	270027-20			TC65	TD-20-350	FM-4520	
C4A	▲100	200	270021-55			FP389.1	TM-4111	T-735	
B	■5	350							
C	▲30	350							
C5	2	50	270027-22			TC302	TD-2-50	MMT-0505	
C6	10	350	270027-26				TD-10-350NP	MT-4520 * MT-4520	Note 1
C7	.82		250221-113						
C8	.82		250221-113						
C9	2.7		250221-119						
C10	2.7		250221-119						
C11	.68		250221-112	TCZ-R68	NP0A-R68				
C12	1.2		250221-115						
C13	2.3-4		250220-2	829-4	3115-01-10				
C14	470		250175-8	DD-471	831-471	UC-5347			
C15	470		250175-8	DD-471	831-471	UC-5347			
C16	47		250175-21	TCN-47	N750K-470	NT-5447			
C17	39		250175-20	TCN-39	N750K-390	NT-5439			
C18	39		250175-20	TCN-39	N750K-390	NT-5439			
C19	10		250221-127	D6-100	GP1K-100	UC-541			
C20	470		250175-8	DD-471	831-471	UC-5347			
C21	470		250175-8	DD-471	831-471	UC-5347			
C22	1500		250175-10	DD-152	801-0015	DC-5215			
C23	.18		250216-4						
C24	.56		250221-111						
C25	1.8		250221-117						
C26	15		250207-5	D6-150	GP1K-150	UC-5415			
C27	3.3		250221-121	TCZ-3R3	NP0A-3R3	ZT-5533			
C28	470		250175-8	DD-471	831-471	UC-5347			
C29	6		250088-137						
C30	10		250088-136	TCN-10	N750K-100	NT-541			
C31	1500		250175-10	DD-152	801-0015	DC-5215			
C32	470		250175-8	DD-471	831-471	UC-5347			
C33	470		250175-8	DD-471	831-471	UC-5347			
C34	470		250175-8	DD-471	831-471	UC-5347			
C35	470		250175-8	DD-471	831-471	UC-5347			
C36	68	500	250159-1043	TCZ-68	NP0-337-680	ZT-5468		KR-1468	
C37	680		250218-10	DD-681	811-681	UC-5368		K-1368	
C38	680		250218-4	DD-681	811-681	UC-5368		K-1368	
C39	430		250218-11	TCZ-430	N750-334-431			KR-1343	
C40	1000		250175-14	DD-521	801-001	DC-521		K-1210	
C41	680		250218-4	DD-681	811-681	UC-5368		K-1368	
C42	680		250218-4	DD-681	811-681	UC-5368		K-1368	
C43	5000		250175-1	DD-502	811-005	DC-525		C-1250	
C44	.22	200	250202-15			PT4022	IMP4-P22	3304022	
C45	1000		250218-8	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C46	1000		250175-14	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C47	5000		250175-1	DD-502	811-005	DC-525	IMP6-D5	C-1250	
C48	.22	200	250202-15			PT4022	IMP4-P22	3304022	
C49	4.7		250221-123	D6-050	GP1K-050	ZT-555		K-1550	
C50	68		250218-7	TCN-68	N750L-680	NT-5468			
C51	68		250218-7	TCN-68	N750L-680	NT-5468			
C52	2700			DD-272	GP2-333-272	UC-5227		C-1227	Note 2
C53	68		250218-7	TCN-68	N750L-680	NT-5468			
C54	10		250207-3	D6-100	GP1K-100	UC-541		K-1410	
C55	5000		250175-1	DD-502	811-005	DC-525		C-1250	
C56	5000		250175-1	DD-502	811-005	DC-525		C-1250	
C57	680		250218-4	DD-681	811-681	UC-5368		K-1368	
C58	680		250218-4	DD-681	811-681	UC-5368		K-1368	

PROPERTY OF
L. F. BLANKENSHIP
1 MEADE ST.
DENVER, COLORADO --

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA MAGNAVOX PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C58	470		250089-117	DD-471	831-471	UC-5347		K-1347	
C60	.0022	400	250312-3	DD-222	GP3-333-S23	PT2223	IMP5-D23	3306223	
C61	.0068	400	250211-8	DD-682	GP3-333-S68	PT2268	IMP5-D68	3306268	
C62	.01	400	250311-7	DD-103	GP3-333-S10	PT411	IMP5-D1	330411	
C63	.01	400	250311-7	DD-103	GP3-333-103	PT411	IMP5-D1	330411	
C64	.01	400	250311-7	DD-103	GP3-333-103	PT411	IMP5-D1	330411	
C65	.0047	600	250301-5	DD-472	GP3-333-472	PT3247	IMP5-D47	3303247	
C66	1000		250175-14	DD-102	801-001	DC-521	IMP5-D1	K-1210	
C67	.0022	400	250312-3	DD-222	GP3-333-S22	PT2S22	IMP5-D22	3306222	
C68	150	500	250159-59	DD-151	GP2K-151	MC3S6		K-1315	
C69	1	600	250211-13	DF-104		PT401	IMP6-P1	330401	
C70A	3000					DC-533	IMP6-D8	C-1250	
B	5000		▪250186-1	▪DC-100	▪1405-01	DC-535	IMP6-D5	C-1350	
C	5000					DC-535	IMP6-D5	C-1350	
C71	.0047	400	250211-5	DD-472	GP3-333-472	PT2347	IMP5-D47	3306347	
C72	3700	500	250160-1069					CR-1227	
C73	.047	400	250312-7						
C74	1000		250216-8		S11-102	MC8S56		KR-1210	
C75	.1	400	250211-13	DF-104		PT401	IMP6-P1	330401	
C76	.047	400	250211-11	DF-503		PT2347	IMP6-D47	3303147	
C77	.0033	600	250201-4	DD-332	GP3-333-332	PT2S33	IMP6-D33	3306233	
C78	.001		250216-8	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C79	1000		250216-8	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C80	.015	200	250212-1	DD5S-153		PT2S15	IMP6-D15	3306115	
C81	.0047	400	250211-5	DD-472	GP3-333-472	PT2347	IMP6-D47	3306347	
C82	.047	200	250212-5	DF-503		PT2147	IMP2-D47	3303147	
C83	1900	500	250181-5041			MC3S63		CR-1329	
C84	360	500	250159-1060					KR-1336	
C85	1000		250216-8	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C86	1000		250216-8	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C87	360	500	250159-1060					KR-1336	Note 3
C88	.0047	400	250211-5	DD-472	GP3-333-472	PT2347	IMP6-D47	3306347	
C89	.047	400	250211-11	DF-503		PT2147	IMP6-D47	3303147	
C90	.022	400	250311-9	DF-303	S17-02	PT2122	IMP6-S22	3304122	
C91	.022	400	250311-9	DF-303	S17-02	PT2122	IMP6-S22	3304122	
C92	.1	600	250201-13	DF-104		PT401	IMP6-P1	330601	
C93	68	3000		DD30-680	5KV-680	DC30S68			
C94	10000	1000	250219-3	DD-103					
C95	10000	1000	250219-2	DD-103					

Note 1. Non-polarized unit.
Note 2. Some versions use 5000MMF in this application (part #250175-1).
Note 3. Some versions use 270MMF in this application (part #250159-1057).
▪ Items C70A, C70B, C70C, R85A, R85B and R85C are combined in one unit.
* Connect negative leads together.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA MAGNAVOX PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500KΩ	½	2202T7-8					Tone and phase switch
R2A	35KΩ		D2201Z9-6	Q11-120	A47-35K-S	AD-26	U29	Horiz. hold
B	Shaft		Not Req.	VQ		FS-3	AK-8	Not Req. Attach to R2A
R3A	50KΩ	½	D2301Z8-3	Q11-133	A47-50K-S	AD-31	U35	Brightness
B	Shaft		Not Req.	VQ		FS-3	AK-8	Not Req. Attach to R3A
R4A	1Meg	½	D2201Z8-25	Q13-127	A47-1Meg-Z	B-70	U53	Volume
B	Shaft		Not Req.	Not Req.		FS-3	AK-8	Not Req. Attach to R4A
R5A	1.25Meg		2201Z9G5	Q11-138	A47-1.5Meg-S	AD-742	U155	Vert. hold
B	Shaft		Not Req.	VQ		FS-3	AK-8	Not Req. Attach R5A
R6A	750Ω	½	D2301Z8-56	Q17-105	A47-750-S	AB-4L5	U-3	Contrast
B	Shaft		Not Req.	Not Req.		FS-3	AK-3	Not Req. Attach to R6A
C	Switch		Not Req.	SWE-12		SW-1	US-28	Not Req. Attach to R6A
R7A	2.5Meg	½	D2301Z46-2	Q11-139	A47-2.5Meg-S	AB-38	U-355	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4		AK-1	Not Req. Attach to R7A
R8A	3000Ω	½	2201Z8-3		39-3000			Vert. linearity-wire wound
R9A	25KΩ	½	2201Z45-1	Q11-120	A47-25K-S	AD-26	SU-39	Horiz. drive
B	Shaft		Not Req.	Not Req.	FKS-1/4		AK-1	Not Req. Attach to R9A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MAGNAVOX PART No.	IRC PART No.	NOTES
R10	100KΩ	½	230104-88	BTS-100K	
R11	100KΩ	½	230104-88	BTS-100K	
R12	22KΩ	½	230104-78	BTS-22K	
R13	1200Ω	½	230145-63	BTA-1200	
R14	100Ω	½	230104-50	BTS-100	
R15	100KΩ	½	230104-88	BTS-100K	
R16	470KΩ	½	230104-94	BTS-470K	
R17	470KΩ	½	230104-94	BTS-470K	
R18	6800Ω	½	230104-73	BTS-6200	
R19	470Ω	½	230104-50	BTS-470	
R20	680Ω	½	230104-60	BTS-680	
R21	330KΩ	½	230104-92	BTS-330K	
R22	33KΩ	½	230104-80	BTS-33K	
R23	68KΩ	½	230104-84	BTS-68K	
R24	470KΩ	½	230104-94	BTS-470K	
R25	330KΩ	½	230104-92	BTS-330K	
R26	22KΩ	½	230104-78	BTS-22K	
R27	150Ω	½	230104-52	BTS-150	
R28	15KΩ	2	230106-78	BTS-15K	
R29	15KΩ	2	230106-78	BTS-15K	
R30	10KΩ 5%	½	230094-183	BTS-10K 5%	
R31	56KΩ 5%	½	230094-201	BTS-56K 5%	
R32	47Ω	½	230104-46	BTS-47	
R33	470Ω	½	230104-58	BTS-470	
R34	15KΩ 5%	½	230094-187	BTS-15K 5%	
R35	1000Ω	½	230104-62	BTS-1000	
R36	56Ω	½	230104-47	BTS-56	
R37	470Ω	½	230104-58	BTS-470	
R38	10KΩ 5%	½	230094-183	BTS-10K 5%	
R39	220Ω	½	230104-54	BTS-220	
R40	470Ω	½	230104-58	BTS-470	
R41	470Ω	½	230104-58	BTS-470	
R42	56KΩ 5%	½	230094-201	BTS-56K 5%	
R43	470Ω	½	230104-58	BTS-470	
R44	18KΩ	½	230105-77	BTA-18K	
R45	220Ω	½	230105-54	BTA-220Ω	
R46	330KΩ	½	230104-92	BTS-330K	
R47	470KΩ	½	230104-94	BTS-470K	
R48	270KΩ	½	230104-91	BTS-270K	
R49	47KΩ	½	230104-82	BTS-47K	
R50	33000Ω 5%	½	230095-171	BTA-3300 5%	
R51	100KΩ	½	230104-88	BTS-100K	
R52	330KΩ 5%	½	230094-219	BTS-330K 5%	
R53	470KΩ	½	230104-94	BTS-470K	
R54	10Meg 5%	½	230094-255	BTS-10Meg 5%	
R55	100KΩ 5%	½	230094-207	BTS-100K 5%	
R56	470KΩ	½	230104-94	BTS-470K	
R57	1000Ω	½	230104-62	BTS-1000	
R58	270KΩ	½	230104-91	BTS-270K	
R59	33KΩ	½	230104-80	BTS-33K	
R60	47KΩ	½	230104-82	BTS-47K	
R61	1000Ω	½	230104-62	BTS-1000	
R62	47Ω	½	230104-46	BTS-47	
R63	33KΩ	½	230104-80	BTS-33K	
R64	22KΩ	½	230104-78	BTS-22K	
R65	4.7Meg	½	230104-100	BTS-4.7Meg	
R66	470KΩ	½	230104-94	BTS-470K	
R67	1.2Meg 5%	½	230094-233	BTS-1.2Meg 5%	
R68	1Meg 5%	½	230094-231	BTS-1Meg 5%	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MAGNAVOX PART No.	IRC PART No.	NOTES
R69	3300Ω	½	230104-86	BTS-3300	
R70	2200Ω	½	230104-85		
R71	10KΩ	½	230104-74	BTS-10K	
R72	4.7Meg	½	230104-106	BTS-4.7Meg	
R73	470KΩ	½	230104-94	BTS-470K	
R74	330KΩ	½	230104-92	BTS-330K	
R75	330KΩ	½	230104-92	BTS-330K	
R76	68KΩ	½	230104-84	BTS-68K	
R77	1Meg	½	230104-98	BTS-1Meg	
R78	22KΩ	½	230104-78	BTS-22K	
R79	3700Ω 5%	½	230094-169	BTS-3700 5%	
R80	330Ω	½	230104-56	BTS-330	
R81	3400Ω 5%	½	230094-168	BTS-3400 5%	
R82	150Ω	½	230104-52	BTS-150	
R83A	22KΩ		▪250186-1	BTS-22K	
B	82000Ω			BTS-8200	
C	8200Ω			BTS-8200	
R84	1Meg	½	230104-98	BTS-1Meg	
R85	270KΩ	½	230105-91	BTA-270K	
R86	1.5Meg	½	230104-100	BTS-1.5Meg	
R87	1.2Meg	½		BTA-1.2Meg	Note 1
R88	1.8Meg	½		BTS-1.8Meg	Note 2
R89	820KΩ	½			Notes 2, 3
R90	12KΩ	½	230104-75	BTS-12K	

▪ Items R83A, R85B, R85C, C70A, C70B, C70C are combined in one unit.
Note 1. Some versions use a 1.8Meg resistor in this application.
Note 2. Not used in some versions.
Note 3. Temperature compensation resistor.
Note 4. Some versions use a 470KΩ, 2 watt resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @1.8A	600VCT @.380A	5VAC @ 3A	D30007G1 3000T8-1①		P-3939-③		P-8333-③		
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @ .30A	6.3VAC @ 11.2A								

① Alternate power trans.
② Drill new mounting holes.
③ Parallel and phase 5, 6.3V-5.8A windings for sec. #4.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Sam PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T2	Horiz. Output Trans.	260610-1	F9418 & RF800 ▪ Z1808	A-8039	235T1 & 214R1 ▪ 236T1	X2OS8 * V313	A-8215 * A-8141	FLY-28 * 26854	D-50 & WC-11 * A-104X
T3	Vert. Output Trans.	3300S7-1				MDP-22	DY-16A ②	Y-16 ②	Y-41-①②
T4A	Yoke (90°) Horiz. (20MH)	380599-5 ①	DF507②	MWC-6④	212R1 ①	303R18 ①	WC-8 ④	WC-33	WC-13 ② ④
B	Vert.(44MH)								
T5	Horiz. Lin. Coil (6.3-13MH)	260608-1	RF800④ ①	MWC-6④	212R1 ①	303R18 ①	WC-8 ④	WC-33	WC-13 ② ④
T6A	Width-Series Coil (.35-3.3MH	260585-1				MWC-10		WC-34	
B	Parallel Coil (4.4-29MH)								

① Includes capacitor C85, resistors R92 and R93.
② Use original yoke damping network.
③ Drill new mounting hole or use original slider and core.
④ Connect to terminals #3 and #9.
⑤ Connect to coded red and blue terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Sam Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
7	9		9	1	5	1	9
5	7		7	3	4	3	7
4	See Note ⑤		See Note ⑤	7	See Note ⑤	T	See Note ⑤
3	1		1	4	1	4	T
2	Term. #3 of RF800		Term. "C" of 214R1	5	7	5	Orange Term. of WC-11
1	Term. #4 of RF800		Term. "D" of 214R1	7	5	7	Black Term. of WC-11
Connect Width Coil Across ⟶	3 & 1	Term. #1 & #2 of RF800 Across 4 & 1	Term. "A" & "B" of 214R1 across 3 & 1	5 & 7	7 & 8	5 & 7	Red & blue term. of WC-11 across 4 & 1
Special Notes		④ ⑦		④ ⑦	⑥		⑥ ⑦

⑥ Connect R110 in series with C93 across terminals #3 and #7 of yoke.
⑦ Remove original width coil and jumper R106. If the picture is out of phase, reverse primary or secondary of replacement width coil.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	MAGNAVOX PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordorson PART No	Triad PART No	NOTES
T7	3.6KΩ	8, 5Ω	320068-1	21010	A-2901	A-3849	24861	S-53X	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V	RATINGS C	RATINGS IMP	MAGNAVOX PART No	QUAM PART No	NOTES
SP1	4"	PM	3.2Ω			583683-1	4A1	
SP2	8"	PM	3.2Ω			583693	8A2	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI	DC RES. SEC.	REPLACEMENT DATA MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant. Coil	0Ω						
L2	UHF Ant. Coil Rod Inductor	0Ω		250188-8				
L3	UHF IF Trap	0Ω		260415-44				
L4	UHF RF Coil	0Ω						
L5	UHF RF Coil Rod Inductor	0Ω		250188-8				
L6	UHF Osc. Coil	0Ω						
L7	UHF Osc. Coil Rod Inductor	0Ω						
L8	UHF Osc. Coil Rod Inductor	0Ω						
L9	UHF Osc. Coil Rod Inductor	0Ω						
L10	UHF Osc. Coil Rod Inductor	0Ω						
L11	Cathode Choke	0Ω		260323-7				
L12	FIL. Choke	0Ω		260576-8				
L13	FIL. Choke	0Ω		260576-8				
L14	FIL. Choke	0Ω		260576-8				
L15	RF Coil	0Ω		260576-8				
L16	UHF IF Coupling Coil	0Ω		260576-12				
L17	RF Choke	0Ω		260576-14				
L18	IF Trap Coil	0Ω						
L19	IF Trap Coil	0Ω						
L20	VHF Ant. Trans	00CT	0Ω	260490-2				
L21	IF Trap Coil	.22Ω		260601-8				IRC part #CLA
L22	VHF Ant. Coils	0Ω						Channel 13
L23	VHF Ant. Coil	0Ω						
L24	UHF IF Input Coil	0Ω		260602-1				
L25	Neut. Coil	0Ω						
L26	VHF RF Coil	0Ω						Channel 13
L27	VHF RF Coils	0Ω						
L28	VHF Mixer Grid Coil	0Ω						Channel 13
L29	VHF Mixer Grid Coils	0Ω						
L30	VHF Osc. Coil	0Ω						Channel 13
L31	VHF Osc. Coils	0Ω						
L32	VHF Osc. Coil	0Ω						Channel 8 1 Microhenry
L33	RF Choke	1.7Ω						
L34	Conv. Plate	0Ω						
L35	1st. Video IF	.3Ω		260540-1	17-4534 *	TV-130 ▪	6219 ▪	
L36	2nd. Video IF	.1Ω	.1Ω	260582-1	17-4522	TV-130	6219	
L37	3rd. Video IF	.1Ω	.1Ω	260583-1		TV-186 ▪	6233 ▪	Includes 47.25MC trap
L38	Shunt Peaking Coil	10Ω		260443-38	19-3500	TV-188	6174	450 Microhenries
L39	Series Peaking Coil	8.5Ω		260443-31	19-3300 ▪	TV-181	6155 ▪	240 Microhenries, wound on 100KΩ resistor
L40	Shunt Peaking Coil	8.5Ω		260443-30	19-3300	TV-185	6155	210 Microhenries
L41	Shunt Peaking Coil	7Ω		260443-29	19-3250 *	TV-185 ▪	6181 ▪	240 Microhenries, wound on 100Ω resistor
L43	1st. Sound IF	.5Ω		260584-1	30-1005	TV-151	1669	
L43	2nd. Sound IF	.5Ω		260584-1	17-3400	TV-151	1669	
L44	Ratio Det.	5.5Ω	1.8ΩCT	260585-1	17-3497	TV-115	6205	Tertiary winding - 6Ω
L45	Horiz. Osc.	55Ω		260579-1	19-1576	TV-163	6210	

* Use wiring with 56KΩ shunt resistor.
▪ Use one winding only.
▪ Use adaptor plate.
▪ Parallel with 100KΩ resistor.
▪ Parallel with 10KΩ resistor.

MAGNAVOX MODELS CMUA455AA, CMUA456AA, CTA455AA, CTA456AA (350 Series)

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L46	.250A	36.2Ω	.75HY	B320065-2B 320065-2①	C5041②		C-2326②		C-23X②

① Alternate filter choke.
② Drill one new mounting hole.

FUSES

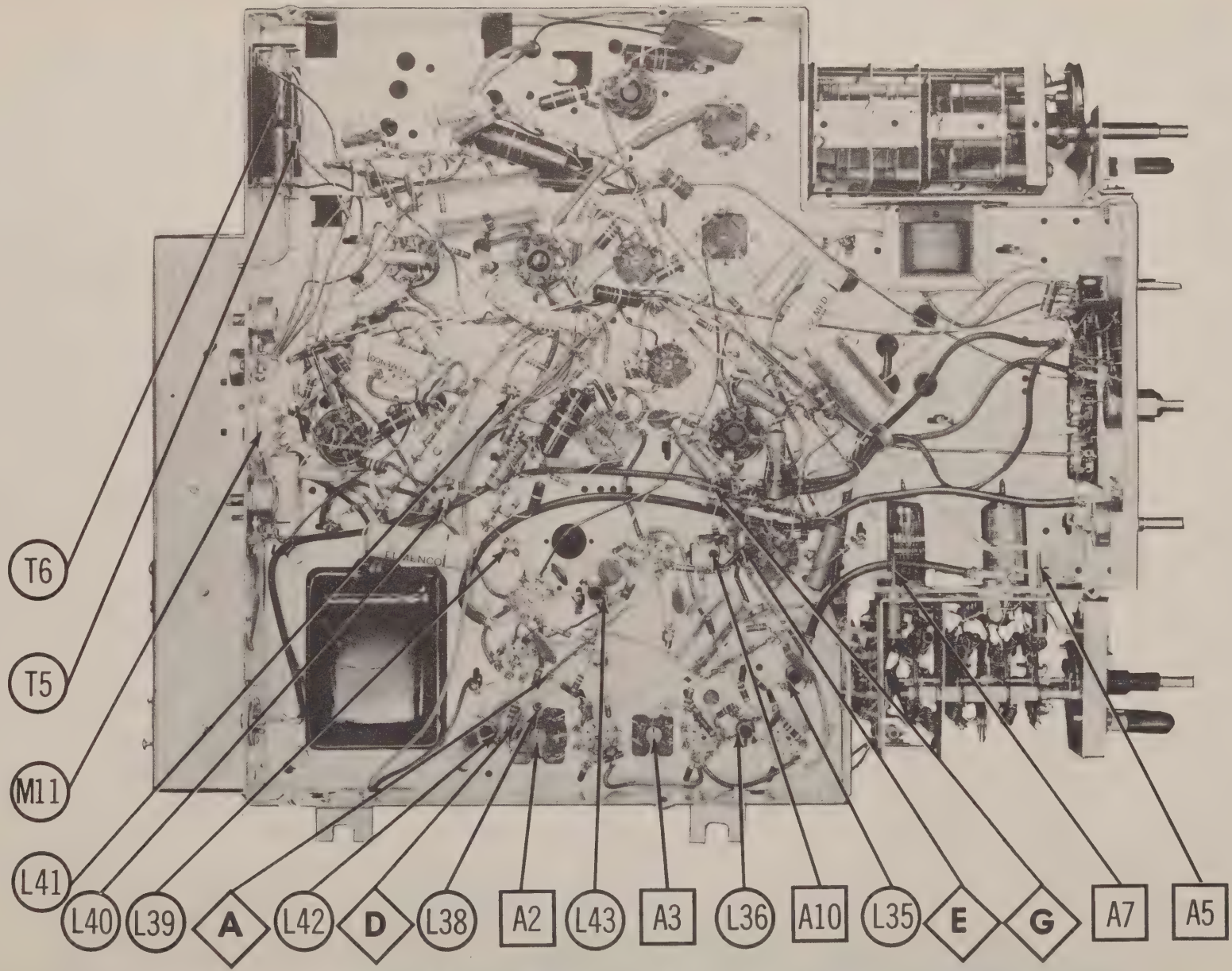
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MAGNAVOX PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	2/10A 125V	180157-23		313.200 (3AG S/B 2/10A)	357001	MDL 2/10	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	SYLVANIA PART No.	
M2	4JB2C	530036-1	1N82 / 1N82A	UHF Mixer
M3	1N64		1N60 / 1N132	Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M4	Dial Light		#47 - VHF Indicator - Models CMUA455AA, CMUA456AA
M5	Dial Light		#47 - UHF Indicator - Models CMUA455AA, CMUA456AA
M6	Dial Light		#47 - VHF Indicator - Models CTA455A CTA456AA
M7	Tuner	700458-1	VHF - All models
M8	Tuner	700459-1	UHF - Models CMUA455AA, CMUA456AA
M9	Video Det. Assy.	360607-1	Includes M3, R41, coils and capacitor
M10	Switch	160247-1	VHF-UHF- Models CMUA455AA, CMUA456AA
M11	Switch	160229-1	Fringe-Local (DPDT-Slide type)
M12	Centering Device	360569-1	
M13	Ion Trap	360492-7	



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

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DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check fuse, M1. Check waveform W17.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C89, C90, C91, C92, R107 and other associated components.	Check L44, C84, C85, C88, R100, R101, R102, R103 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19, and V21. Check adjustments B2 and B3. Check R102, R107, R9, R104, C86, C87, C88 and other associated components.

BLOOMING

Check by substitution V18, V19, V20 and V21. Check R107, C88 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of value. Raster, No Sound, No Picture, UHF, substitute V1.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

KEYSTONE EFFECT

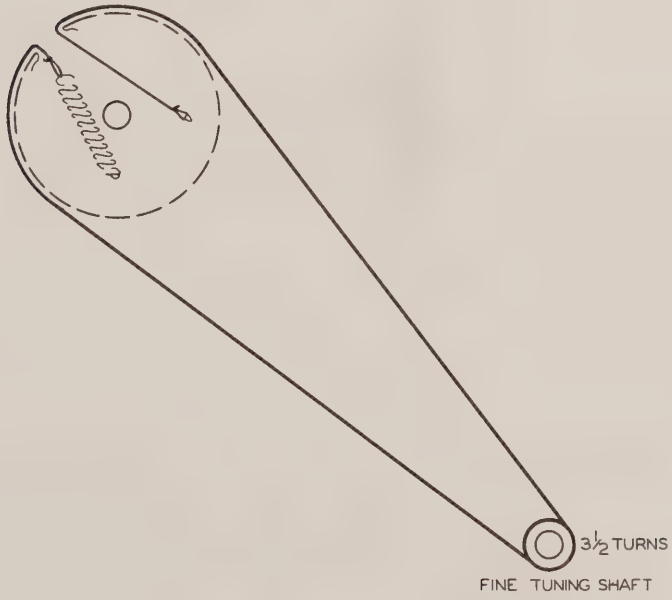
Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PULLEY IN MAX. COUNTER CLOCKWISE POSITION



UHF FINE TUNING DRIVE CORD STRINGING

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

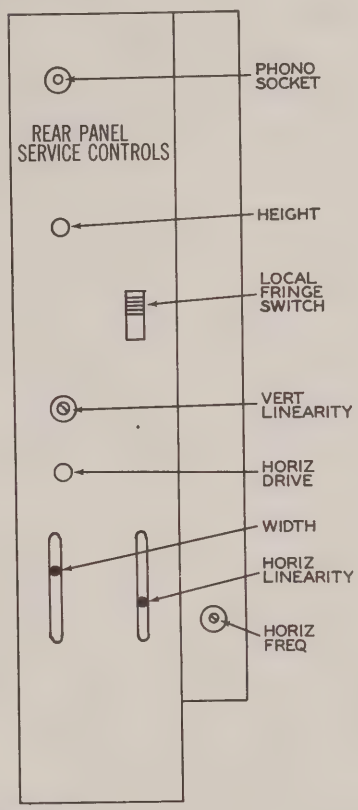
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 4 wood screws holding metal strip at the top of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency coil slug (L44) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L43) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 10 push-on type control knobs from front panel of cabinet.
2. Remove 8 wood screws. Remove rear cover.
3. Disconnect yoke plug, HV lead and speaker leads.
4. Remove 2 wood screws from top chassis supports.
5. Remove 2 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speakers.

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PHOTOFACT* Folder

RAYTHEON MODELS C-2163, C-2166, M-2165, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, AS, 21T25AGH, AS, 21T27AGH, AS)

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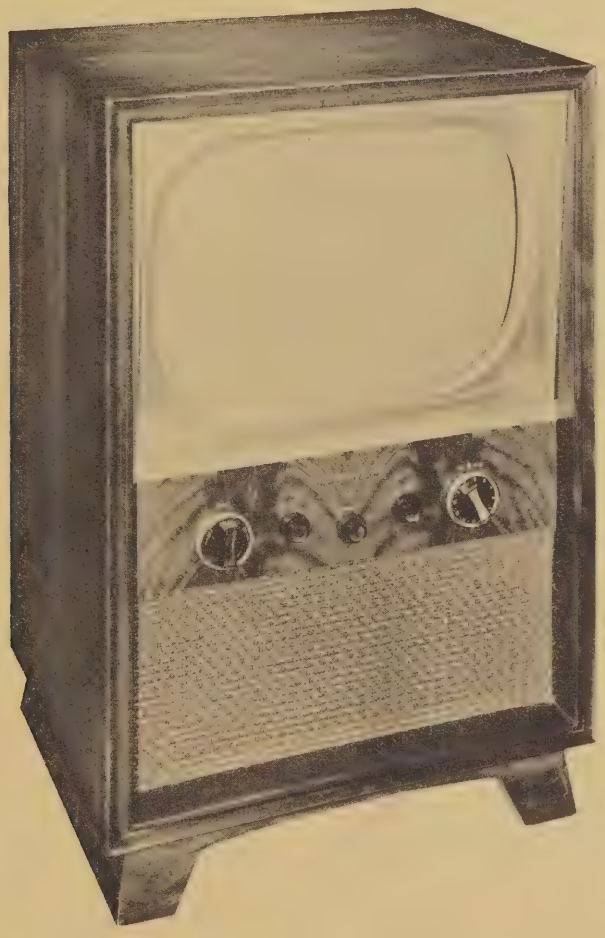

MODEL C-2166

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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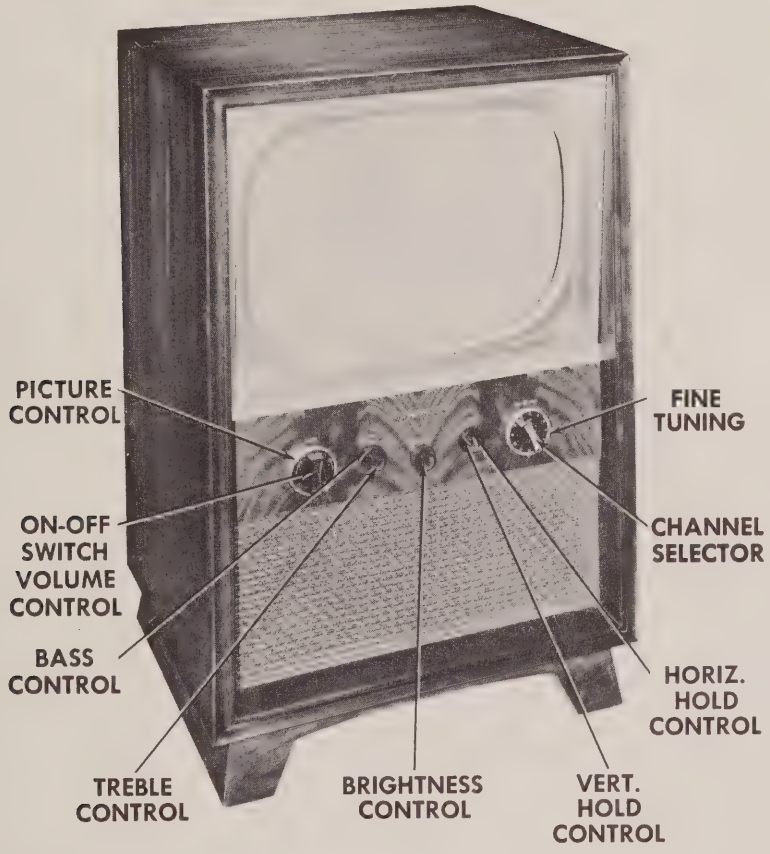
3[illegible] MENDE ST.
DENVER, COLORADO

RAYTHEON MODELS C-2163, C-2166, M-2165, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, AS, 21T25AGH, AS, 21T27AGH, AS)



RAYTHEON MODEL C-2166

TRADE NAME	Raytheon	MODELS	CHASSIS
		UM-2160A, UM-2160C, UM-2160G, UM-2160K, UM-2161D, UM-2161F, UM-2162E, UM-2162L, UM-2162M	21T19AGH
		UC-2164	21T20AGH
		UM-2165, UM-2165C	21T24AGH
		M-2165	21T24AS
		UC-2166	21T25AGH
		C-2166	21T25AS
		UC-2163	21T27AGH
		C-2163	21T27AS

MANUFACTURER	Raytheon Manufacturing Co., Television & Radio Div., 5921 W. Dickens Ave., Chicago 39, Ill.
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC-60 Cycles RATING 1.32 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 46.75MC, Sound IF 42.25MC (Intercarrier)

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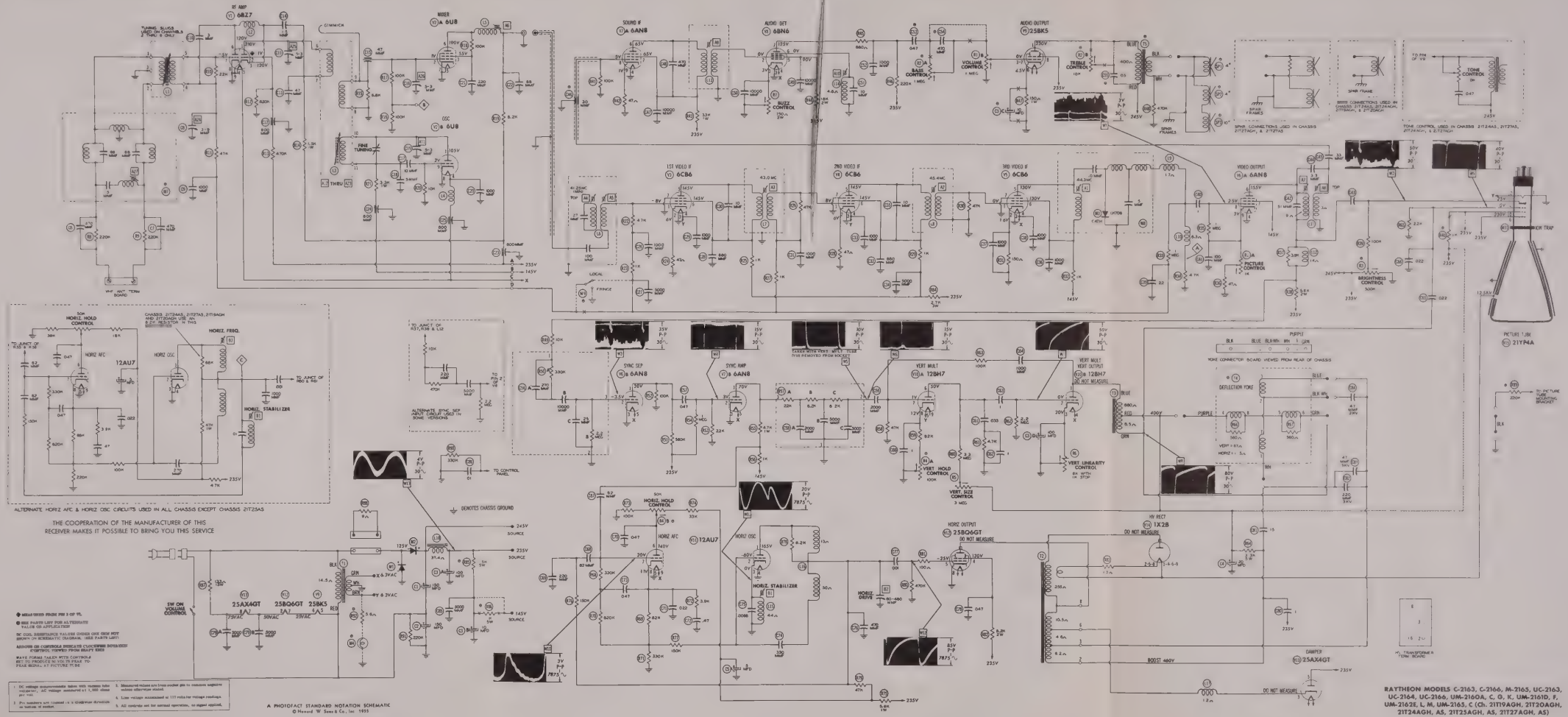
RF AMP V1 6BZ7
MIXER V2a 6U8
OSC V2b 6U8
SOUND IF V7a 6AN8
AUDIO DET V8 6BN6
AUDIO OUTPUT V9 25BK5
1ST VIDEO IF V5 6CB6
2ND VIDEO IF V6 6CB6
3RD VIDEO IF V4 6CB6
VIDEO OUTPUT V3a 6AN8
SYNC SEP V10a 6AN8
SYNC AMP V7b 6AN8
VERT MULT V10b 12BH7
HORIZ AFC 12AU7
HORIZ OSC
HORIZ OUTPUT V12a 25BQ6GT
HV RECT V12b 1X2B
DAMPER V11 25AX4GT
PICTURE TUBE V13 21YP4A
ION TRAP
YOKE CONNECTOR BOARD VIEWED FROM REAR OF CHASSIS
ALTERNATE HORIZ AFC & HORIZ OSC CIRCUITS USED IN ALL CHASSIS EXCEPT CHASSIS 21T25AS
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RAYTHEON MODELS C-2163, C-2166, M-2165, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, A5, 21T25AGH, A5, 21T27AGH, A5)

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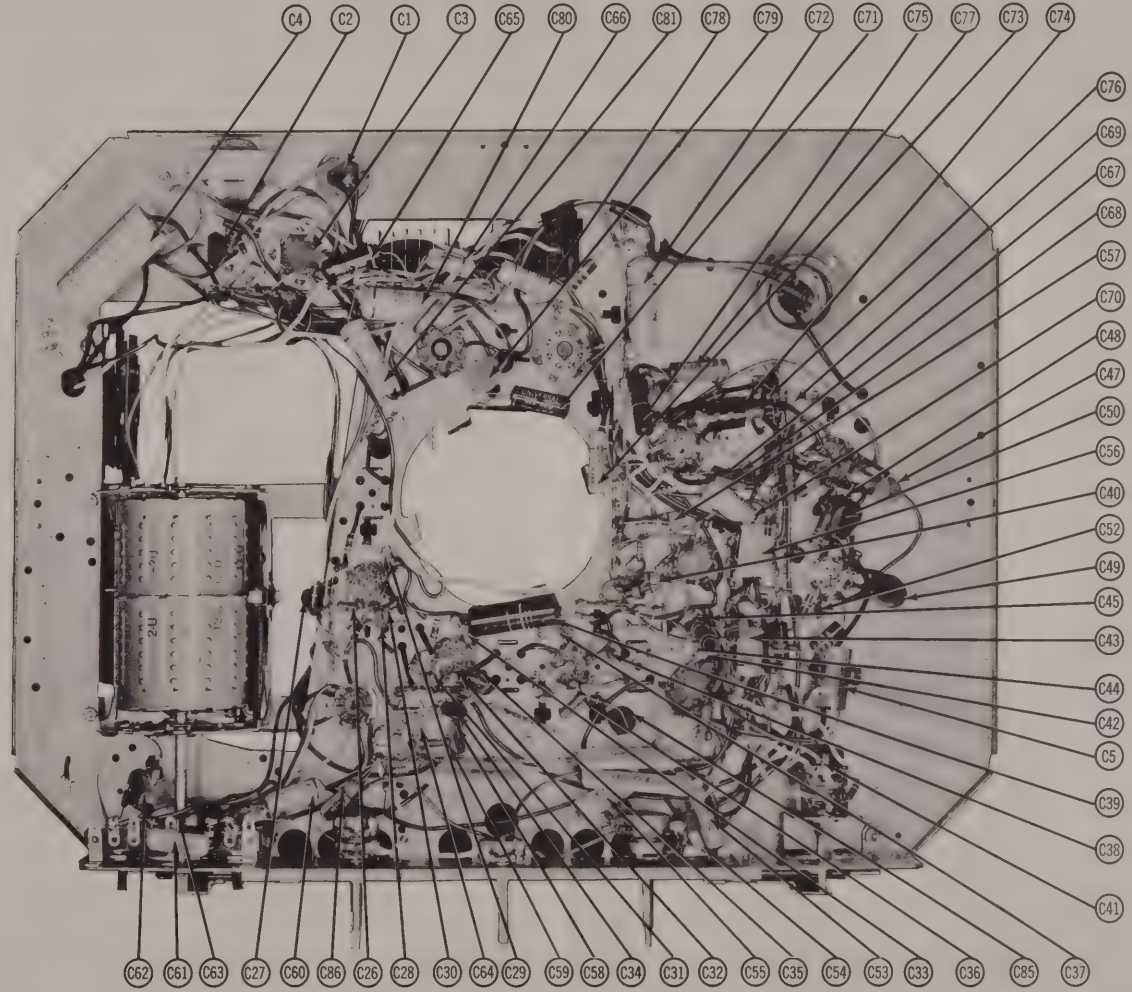
CHASSIS TOP VIEW

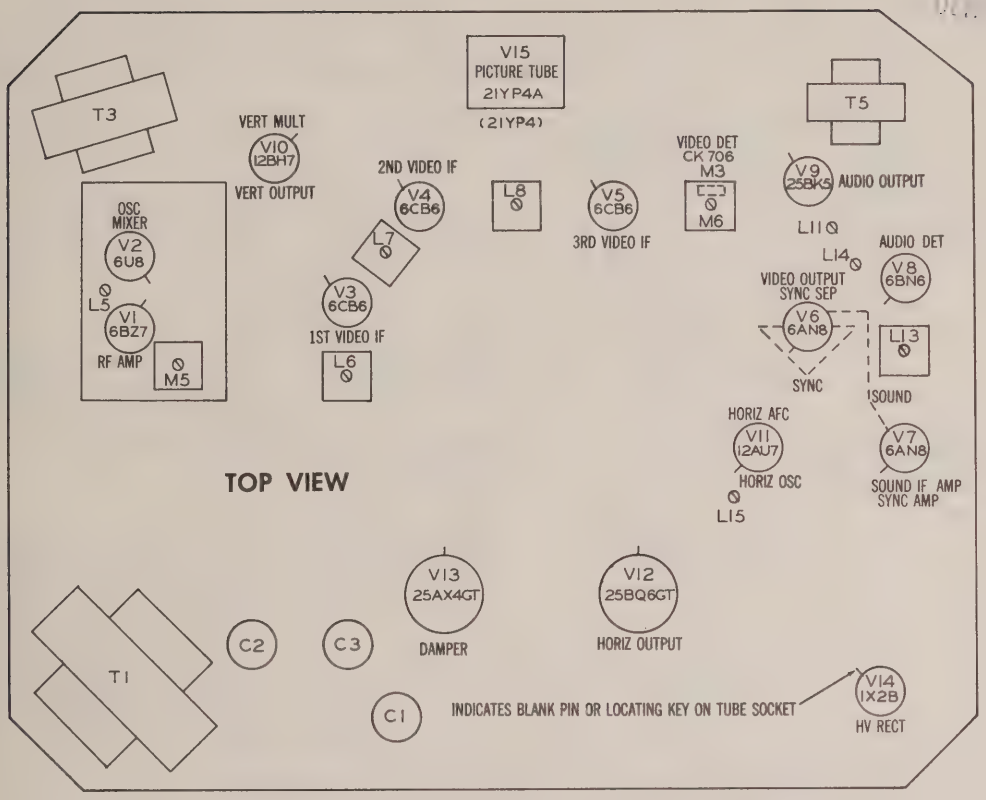
RAYTHEON MODELS C-2163, C-2166, M-2165, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, A5, 21T25AGH, A5, 21T27AGH, A5)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

RAYTHEON MODELS C-2163, C-2166, M-2163, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21119AGH, 21120AGH, 21124AGH, A5, 21123AGH, A5, 21127AGH, A5)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

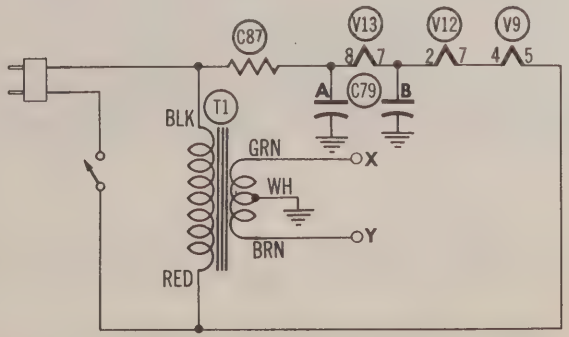
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V7, V10
No horiz. sync - V7, V11
No vert. or horiz. sync - V6, V7

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1, M2
Vert. off freq. - V7, V10
Horiz. off freq. - V7, V11



RAYTHEON MODELS C-2163, C-2166, M-2165, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2161D, F, UM-2162E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, A5, 21T25AGH, A5, 21T27AGH, A5)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.

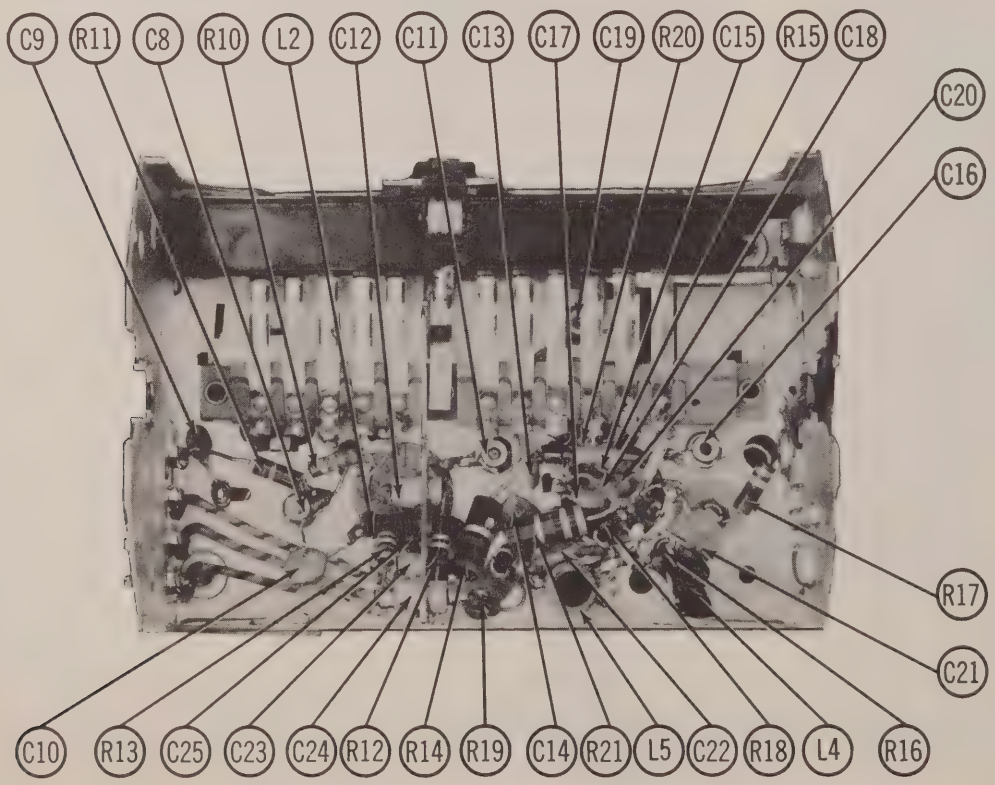
VIDEO IF ALIGNMENT

The local oscillator should be disabled to reduce the possibility of erroneous indications. To do this remove the tuner bottom shield and place a strip of transparent cellulose tape across the first two contacts (from front) of an unused channel strip, then switch the tuner to this insulated channel strip.
Connect a .001MFD capacitor across the vertical input terminals of the oscilloscope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	Not used	44.3MC (Unmod)	Any	Use VTVM. DC probe to point (A). Common to chassis.	A1	Attenuate generator output not to exceed 2 volts at VTVM. Adjust for maximum deflection.
2.	"	"	"	45.4MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	43.0MC (10MC Swp)	42.5MC 45.6MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Use only enough sweep generator output for usable pattern on scope. Check for response similar to Fig. 1. If necessary, retouch A1, A2 and A3 for desired response.
5.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	Not used	41.25MC	"	Use VTVM. DC probe to point (A). Common to chassis.	A4	Adjust for MINIMUM deflection.
6.	"	"	43.0MC (10MC Swp)	41.25MC 42.5MC 45.6MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A5, A6	Adjust A5 and A6 for response curve similar to Fig. 2. 42.5MC and 45.6MC markers at 50% on response curve. Adjust A5 for proper band width and position of 42.5MC and 45.6MC markers. Adjust A6 for maximum amplitude and MINIMUM tilt. Increase sweep generator output to observe 41.25MC trap position on scope. If necessary, SLIGHTLY retouch A4 for correct 41.25MC marker position as in Fig. 2. If unable to obtain correct response curve as in Fig. 2, repeat steps 1 thru 6.

SOUND IF ALIGNMENT

Remove the strip of transparent cellulose tape from tuner strip and replace tube shield over converter tube.
Tune in a TV station and adjust the fine tuning control until sound bars just appear in the picture. Adjust A7 fully counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound.
Insert an attenuator in series with the antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the receiver by placing the antenna lead near the antenna terminals.
Reduce the signal strength input to the receiver so that the signal falls below the limiting level of the 6BN6 (V8) as evidenced by a hiss in the sound.
Adjust the secondary of the sound take-off transformer (A8), the sound IF transformer (A9), the quadrature coil (A10) and the buzz control (R7) for maximum sound and minimum buzz. If hiss disappears while making adjustments increase attenuation until hiss reappears.



RF TUNER BOTTOM VIEW

ALIGNMENT INSTRUCTIONS (cont)

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OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the tuner AGC. Connect positive lead to tuner chassis. Complete oscillator alignment may not be necessary.
If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A-11. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment A-11 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. The channel oscillator adjustment screws are reached thru a hole just to the left and above of the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A12	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

RF AND MIXER ALIGNMENT

Connect bias as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 4, with markers above 90%.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel make compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

IF WAVE TRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF bandpass (40-48MC). Tune in a TV station on which the interference is noted and adjust A27 for minimum interference in the picture.

UHF TUNER ALIGNMENT

The UHF tuner has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

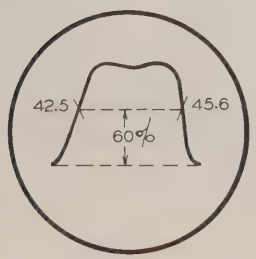


FIG. 1

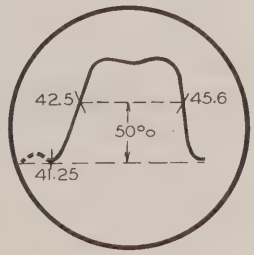


FIG. 2

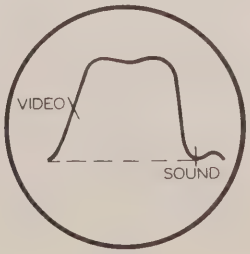


FIG. 3

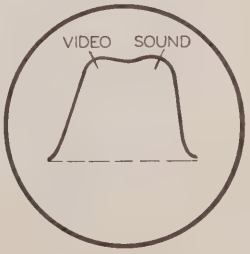
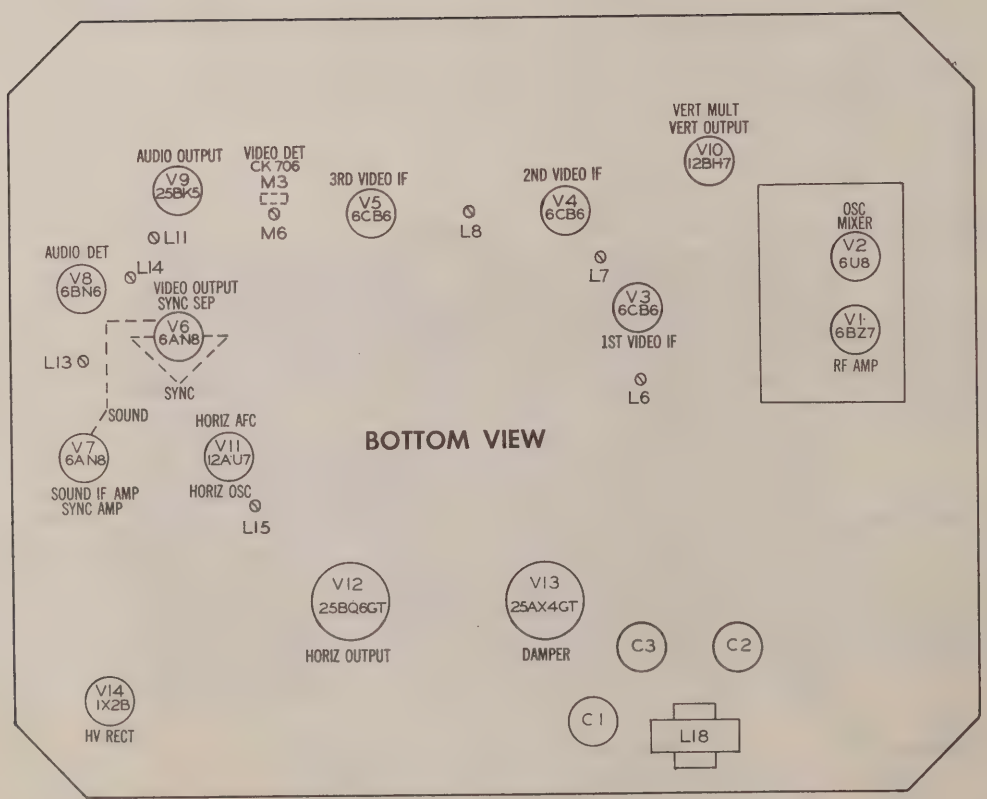


FIG. 4

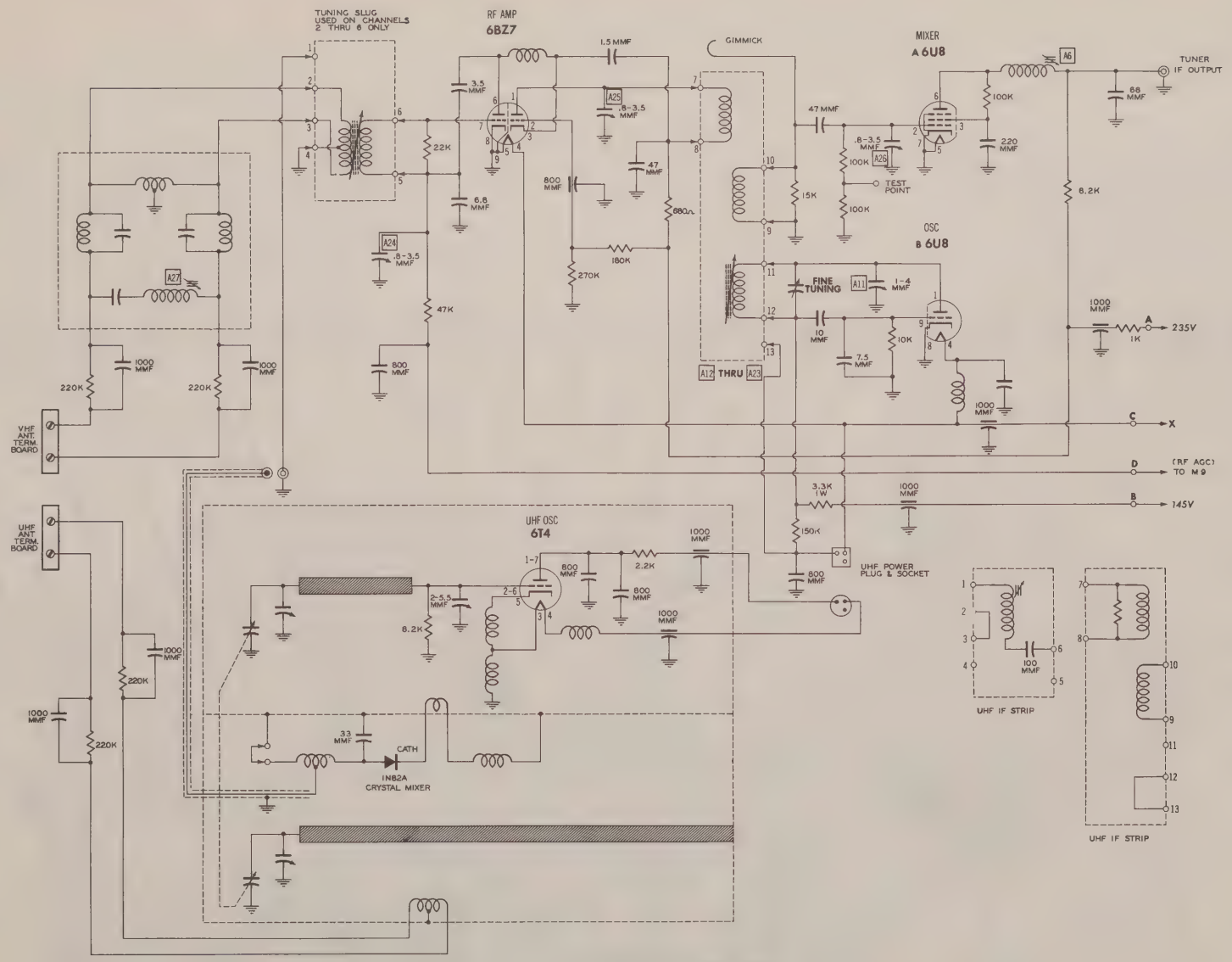
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1.5KΩ	320KΩ	INF	0Ω	.1Ω	INF	1Meg	0Ω	0Ω
V 2	6U8	†5.8KΩ	200KΩ	†100KΩ	.1Ω	0Ω	†8.2KΩ	0Ω	0Ω	10KΩ
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 4	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 5	6CB6	.1Ω	150Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 6	6AN8	†180KΩ	2.2Meg	0Ω	0Ω	.1Ω	†5.6KΩ	†2.5KΩ	1Meg	180Ω
V 7	6AN8	†8.2KΩ	22KΩ	0Ω	0Ω	.1Ω	†33KΩ	†33KΩ	100KΩ	47Ω
V 8	6BN6	350Ω	.3Ω	0Ω	.1Ω	†18KΩ	4.8Ω	†220KΩ		
V 9	25BK5	†400Ω	NC	350KΩ	8.5KΩ	8.5KΩ	150Ω	350KΩ	†40Ω	NC
V 10	12BH7	▲4KΩ	2.2Meg	1.5KΩ	.2Ω	.2Ω	▲4Meg	47KΩ	120KΩ	1.8Ω
V 11	12AU7	†50KΩ	500KΩ	44Ω	0Ω	0Ω	†50KΩ	1.5Meg	400KΩ	.1Ω
V 12	25BQ6GT	NC	8.5KΩ	NC	†8.2KΩ	470KΩ	NC	8.5KΩ	0Ω	TOP CAP ▲12Ω
V 13	25AX4GT	TP	NC	1Meg	NC	†40Ω	NC	8.5KΩ	8.5KΩ	
V 14	1X2B		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲270Ω
V 15	21YP4A	0Ω	22KΩ	PIN 6 †40Ω	PIN 10 †1KΩ	PIN 11 †200KΩ	PIN 12 .1Ω			

† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V13.
TP - TIE POINT
NC - NO CONNECTION



TUBE PLACEMENT CHART



UHF - VHF TUNER USED WITH SOME VERSIONS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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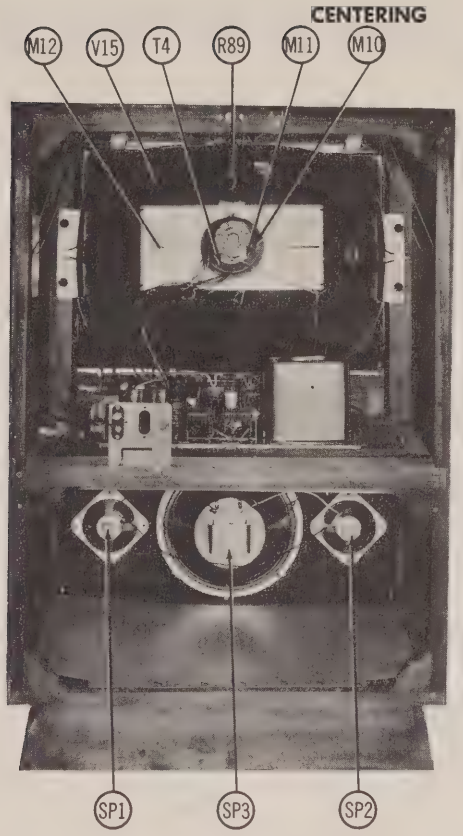
ALTERNATE TUNER SCHEMATIC



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS FOR CHASSIS 21T25AS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position. Adjust the horizontal stabilizer slug (B1) until the picture synchronizes horizontally.

Momentarily remove signal by switching off channel and back again. If picture does not immediately fall into sync, SLIGHTLY retouch B1. Repeat procedure until best picture lock-in is obtained on all channels.

Set the horizontal drive trimmer (B2) clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS FOR CHASSIS 21T24AS, 21T27AS, 21T19AGH, 21T20AGH, 21T24AGH, 21T25AGH OR 21T27AGH

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position.

Connect a short jumper across the horizontal stabilizer coil (L15).

Starting with the horizontal frequency slug (B3) all the way out (counter clockwise). Adjust B3 in a clockwise direction until the picture synchronizes.

Remove short from L15; connect the vertical input of an oscilloscope thru a 10KΩ resistor to point ◇. Low side to chassis.

Adjust the horizontal stabilizer slug (B1) until the broad and narrow peaks of the waveform on the scope are of equal height as shown in Fig. 5. If necessary during adjustment B1, adjust B3 to keep the picture synchronized.

Remove scope from set. Picture should now remain in sync while switching off channel and back again. If not, adjust the horizontal hold control.

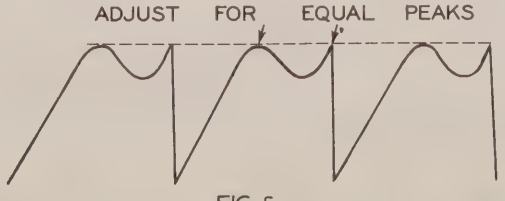


FIG. 5

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check M1 and M2. Check adjustment B2. Check T2, T4A, R88, R82, C77 and other associated components.

DRIVE LINES

Check by substitution V12 and V13. Check adjustment B2. Check R88, R82, C77, T2 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V12 and V13. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V11, V12 and V13. Check C73, C71, R70 for open. Check L15, L16, R72, R4B and other associated components.

XMAS TREE EFFECT

Check by substitution V11, V12 and V13. Check T2 and T4 for internal arcing. Check L15, L16, C75, C69, C68, C74, R78, R74 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V10. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T3, R64, R63, R58, C64, C4 and other associated components.	Check R59, R60, R5, C63, C60 and other associated components.

INSUFFICIENT SWEEP

Substitute V10. Check vertical size and vertical linearity controls for proper operation. Check R60, T3 and other associated components.

COMPRESSED AT BOTTOM

Substitute V10. Check C63, C60, R5, R60 and other associated components.

COMPRESSED AT TOP

Substitute V10. Check R6, R64, C63, C3D, T3, T4B and other associated components.

FOLDS

Substitute V10. Check C61, C62, C63, R61 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V7. Check C56A, C56B, C57, R51, R55, R56 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V10. Check vertical integrator network. Check C59, C60, R4A, R59 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V11. Check C67, C71, C73, R4B, R74 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V7 and V11. Check components associated with V11.

VIDEO

LOSS OF VIDEO

Substitute V6. Check R38, R36, C40, C41, C43 and other associated components.

SOUND BARS(4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A7. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check C40, C43, L9, L12, R37, R38 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check C40, C43, L12, R37 and other associated components.

SMEAR

Substitute V6. Check video crystal detector network. Check L9, L10, L12, C40, C43 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stage V9 using audio signal generator. Apply signal across R1B.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C49, C53, C3C, R45, R46, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A10 and R7 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, except V9, V12 and V13, check T1. If V9, V12 and V13 fail to light, check filament continuity and R87, since these tubes are connected in series. Check interlock assembly and switch on volume control. If filaments light, check M1, M2 and R88. Check B+ filter and decoupling network.

SMALL AND/ON DIM PICTURE

Check M1, M2 and R88. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RAYTHEON PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Mixer-Osc.	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output-Sync Separator	6AN8	6AN8	9DA	
V7	Sound IF Amp.-Sync Amplifier	6AN8	6AN8	9DA	
V8	Audio Detector	6BN6	6BN6	7DF	
V9	Audio Output	25BK5	25BK5	9BQ	
V10	Vert. Mult.-Vert. Output	12BH7	12BH7	9A	
V11	Horiz. AFC-Horiz. Osc.	12AU7	12AU7	9A	
V12	Horiz. Output	25BQ6GT	25BQ6GT	6AM	
V13	Damper	25AX4GT	25AX4GT	4CG	
V14	HV Rectifier	1X2B	1X2B	9Y	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	RAYTHEON PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V15	21YP4A ① 21YP4	21YP4A ① 21YP4	21YP4A ① 21YP4	21YP4A ② 21YP4	21YP4A ① 21YP4	12L 12L	① Aluminized ② Silver screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	150	150	8C-22464			FP117	TM-150-150	T-050	
C2	150	150	8C-22463			FP117	TM-150-150	T-050	
C3A	■100	300	8C-22130			FP451	TM-4130	Q-280	
B	▲10	450						MTH-2510	
C	▲10	75							Note 1
D	100	25							
C4	20	450	8C-13242			TC75	TD-20-450	FM-4520	
C5	5	300	8C-24174			TC60	TD-8-350	FM-3508	
C6	470	500	8G-22656	D6-471	GP2K-471	MC245		K-1347	
C7	470	500	8G-22656	D6-471	GP2K-471	MC245		K-1347	
C8	3-9		100S-24332	829-10					
C9	1000		100S-24333	DD-102	801-001	DC-521			
C10	3		102S-24516	TCZ-3R3	NP0A-3R3	ZT-5533			
C11	.5-3		101S-24410	829-3	3115-01-0R5	CT565A			
C12	800		102S-24514						
C13	47		102S-24515	DD-470	831-470	UC-5447			
C14	1.5		102S-24521	TCZ-1R5	NP0A-1R5	ZT-5515			
C15	47		102S-24517	MFT-50					
C16	.5-3		101S-24410	829-3	3115-01-0R5	CT565A			
C17	10		102S-24519	TCN-10	N750K-100	NT-541			
C18	5		102S-24518						
C19	.5-3		101S-24410	829-3	3115-01-0R5	CT565A			
C20	1000		100S-24333	DD-102	801-001	DC-521			
C21	220		102S-24520	DD-221	811-221	UC-5322			
C22	68		102S-24523	TCN-68	N750L-680	NT-5468			
C23	800		102S-24522						
C24	800		102S-24522						
C25	800		102S-24522						
C26	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C27	5000		8G-13962	DD-502	811-005	DC-525		C-1250	
C28	680		8G-21105	D6-681	GP2K-681	UC-5368		K-1368	
C29	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C30	10		8G-19502	TCN-10	N750K-100	NT-541		KR-1410	
C31	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C32	680		8G-21105	D6-681	GP2K-681	UC-5368		K-1368	
C33	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C34	5000		8G-13962	DD-502	811-005	DC-525		C-1250	
C35	10		8G-19502	TCN-10	N750K-100	NT-541		KR-1410	
C36	1000		8G-20754	D6-102	GP2L-102	UC-521		K-1210	
C37	1000		8G-20754	D6-102	GP2L-102	UC-521		K-1210	
C38	1000		8G-13201	DD-102	801-001	DC-521		K-1210	
C39	.22	200	8K-23086			PT4022	IMP2-P22	3302022	
C40	.1	200	8K-23084	DD-104		PT401	IMP2-P1	330201	
C41	100		8G-11734	D6-101	GP1K-101	UC-531		K-1310	
C42	51		8G-23793						
C43	.1	400	8K-23095	DF-104		PT401	IMP4-P1	330401	
C44	3.3		8L-23551	TCZ-3R3	NP0A-3R3	ZT-5533			
C45	33		8G-19503	TCZ-33	NP0L-330	ZT-5433		KR-1433	
C46	30		14B-23772						Note 2
C47	10000		8G-20269	DD-103	811-01	DC-511			
C48	470	500	8F2-121	D6-471	811-471	MCB245		KR-1347	
C49	10000		8G-20269	DD-511	811-01	DC-511			
C50	10000		8G-20269	DD-511	811-01	DC-511			
C51	10		8G-11789	TCZ-10	NP0K-100	ZT-541		KR-1410	
C52	1000		8G-13201	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C53	.047	400	8K-23094	DF-503		PT4147	IMP4-S47	3304147	Note 3
C54	470	500	8F3-121	D6-471	GP2K-471	MC245	IMP6-T5	K-1347	Note 4
C55	.05	600	8K-23015	DF-503		PT615	IMP6-S5	330615	Note 5
C56A	270		†17A-24212	†PC-260	GP2K-271 811-01 GP1K-250	UC-5327		K-1327	
B	10000					DC-511		330611	
C	25					UC-5425		K-1425	
C57	.047	200	8K-23083	DF-503		PT4147	IMP2-S47	3302147	
C58A	2000		♦17A-22376	♦PC-100	♦1405-01	DC-522	IMP6-D2	C-1220	
B	5000					DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C59	2000		8G-19522	D6-202	GP2-333-202	UC-522	IMP6-D2	C-1220	
C60	.1	200	8K-23084	DF-104		PT401	IMP2-P1	330201	
C61	.033	400	8K-23816	DF-303		PT4133	IMP6-S3	3306133	
C62	.1	200	8K-23084	DF-104		PT401	IMP2-P1	330201	
C63	.1	400	8K-23095	DF-104		PT401	IMP4-P1	330401	

PROPERTY OF
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DENVER, COLORADO

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
			REPLACEMENT DATA						
C54	1000	1500	8G-23781	DD30-102	1RSKV-102	MCE310	CT36-D1	C-3210	
C55	.033	600	8K-23104	DF-303	817-03	PT4123	IMP4-S23	3304123	
C56	.022	300	8K-23092	DF-303	817-02	PT4123	IMP4-S23	3304123	
C57	82	500	8P3-118	D6-520	GP1K-820			K-1482	
C58	82	500	8P3-118	D6-520	GP1K-820			K-1482	
C59	220	500		D6-521	GP2K-221	UC-5322		K-1322	
C70	.047	600	8K-23094	DF-503		PT4147	IMP4-S47	3304147	
C71	.033	300	8K-23083	DF-303	817-03	PT4123	IMP4-S23	3304123	
C72	.47	300	8K-23087			PT4067	IMP3-P47	3303047	
C73	.047	300	8K-23088	DF-503		PT4147	IMP4-S47	3304147	
C74	330	500		D6-331	811-331			KM-1333	
C75	.0068	600				MCE469			
C76	470	500		D6-471	811-471	MCE245		KM-1347	
C77	.001	600	8K-23089	D6-102	GP2L-102	PT521	IMP6-D1	3302E1	
C78	.047	400	8K-23094	DF-503		PT4147	IMP4-S47	3304147	
C78A	5000		8Q-23790	DD2-502	811-D05	DC-535		C-1250	
B	5000			D6-502	811-D06	DC-535		C-1250	
C80	.1	600	8K-23106	DF-104		PT901	IMP6-P1	3306D1	
C81	.15	200	8K-23065			PT4015	IMP5-P15	3303015	
C82	220	3000	8K-23093	DD30-221	5KV-221	DC30047		K-4447	
C83	47	3000	8K-24038	DD30-470	5KV-470	DC30447		K-4447	
C84	47	3000	8Q-23848	DD30-470	5KV-470	DC30447		K-4447	
C85	5000		8Q-23963	DD-502	811-D05	DC-535		C-1250	
C86	.01	400	8K-23091	D6-103	GP2-233-103	PT411	IMP4-S1	3304I1	

Note 1. C3C is not used in chassis 21T18AGH and 21T20AGH.
Note 2. C48 is a shielded lead.
Note 3. Chassis 21T19AGH, 21T24AGH, 21T24AGS, 21T24AGN, 21T27AS and 21T27AGH use .01MFD in this application. (Part #8K-23092).
Note 4. Not used in chassis 21T18AGS, 21T20AGS, 21T24AS, 21T24AGS, 21T27AS and 21T27AGH.
Note 5. Chassis 21T18AGH and 21T20AGH use .01MFD in this application (part #8K-23092).
† Items C58A, C58B, C58C, R58A and R58B are combined in one unit.
• Items C58A, C58B, C58C, R57A, R57B and R57C are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	RAYTHEON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
			REPLACEMENT DATA					
R1A	1000Ω	½	B-10A-23714	*QJ-734	RTY-486	F1-4	UF-13L	Picture - Panel
B	1Meg	½				R2-52	UR18A **	Volume - Rear - Attach to R1A
C	Switch					KB-1	US-28	Attach to R1B
R2A	1Meg	½	B-10B-24164	◆QJ-537		F1-55	UF16L	Bass - Panel - Note 5
B	10KΩ	½				R2-23	UR14L	Treble-Rear - Attach to R2A
R3	10KΩ	½	B-10B-24281					Tone - Note 2
R3A	500KΩ	½	B-10B-24259	QJ-133	A47-500K-S	B-59	U-50	Brightness - Note 3
B	Shaft		Not Req.	Not Req.	FS-2	Not Req.	Not Req.	Attach to R3A
R3A	500KΩ	½	B-10B-23695	QJ-133	A47-500K-S	AB-59	U-50	Brightness - Note 4
B	Shaft		Not Req.	Not Req.	KBS-3	AK-4	Not Req.	Attach to R3A
R4A	100KΩ	½	B-10B-24143	††QJ-536	RTY-519	F1-51	UF15L	Vert. Hold-Panel-Note 5
B	50KΩ	½				R2-39	UR16L †	Horiz. Hold-Rear-Attach to R4A
R4A	150KΩ	½	B-10B-24162-1	◆QJ-772				Vert. Hold-Panel-Note 1
B	50KΩ	½						Horiz. Hold-Rear-Attach to R4A
R4A	500KΩ	½	B-10B-23693-1					Vert. Hold-Note 4
R4A	50KΩ	½	B-10B-23594	QJ-123	A47-50K-S	AB-31	U-35	Horiz. Hold-Note 4
B	Shaft		Not Req.	Not Req.	KBS-3	AK-4	Not Req.	
R5A	5Meg	½	B-10B-23596	QJ-140	A47-5Meg-S	AB-84	SU-59	Vert. Size
B	Shaft		Not Req.	Not Req.	FKB-1/4	AK-1	Not Req.	Attach to R5A
R6A	5000Ω	½	B-10B-23407	QJ-114 •	A47-5000-S •	AB-10 •	SU-10 •	Vert. Linearity (stop ⑤ 1000Ω)
B	Shaft		Not Req.	Not Req.	FKB-1/4	AK-1	Not Req.	Attach to R6A
R7	750Ω	2	A-10D-23597		99-750			Buzz

* CONCENTRIKIT EQUIVALENT. KIT K-6, BASE ELEMENTS & SHAFTS: B1-108, P1Y-102 (Panel) B13-137, R8-115 (Rear) SWITCH T8-1
▲ CONCENTRIKIT EQUIVALENT: KIT K-3, BASE ELEMENTS & SHAFTS: B1-137, P7-109 (Panel) B11-115, R1-124 (Rear)
■ CONCENTRIKIT EQUIVALENT: KIT K-3, BASE ELEMENTS & SHAFTS: B1-137, P7-109 (Panel) B11-123, R2-124 (Rear)
†† CONCENTRIKIT EQUIVALENT: KIT K-3, BASE ELEMENTS & SHAFTS: B11-128, P7-108 (Panel) B11-123, R2-124 (Rear)
† Universal replacement (Mallory exact duplicate part #UE187).
** Universal replacement (Mallory exact duplicate part #UE250).
◆ Connect a 1000Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminals of the original control (control viewed from the shaft end, terminals down).
Note 1. Used in chassis 21T24AS, 21T27AS, 21T25AGH.
Note 2. Used in chassis 21T24AGH, 21T27AGH, 21T24AS, 21T27AS.
Note 3. Used in chassis 21T24AGH, 21T25AGH, 21T27AGH, 21T24AS, 21T27AS, 21T25AS.
Note 4. Used in chassis 21T18AGH, 21T20AGH.
Note 5. Used in chassis 21T24AS, 21T25AS, 21T27AS.
Note 6. Used in chassis 21T25AS, 21T25AGH.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R6	220KΩ	½	9B1-27	BTS-220K	
R9	220KΩ	½	9B1-27	BTS-220K	
R12	22KΩ	½		BTS-22K	
R11	47KΩ	½		BTS-47K	
R13	820KΩ	½		BTS-820K	
R15	470KΩ	½		BTS-470K	
R16	1500Ω	1		BTA-1500	
R15	6800Ω	½		BTS-6800	
R16	100KΩ	½		BTS-100K	
R17	100KΩ	½		BTS-100K	
R18	100KΩ	½		BTS-100K	
R19	8200Ω	½		BTS-8200	
R20	10KΩ	½		BTS-10K	
R21	3300Ω	1		BTA-3300	
R22	4700Ω	½	9B1-70		Note 1
R23	100KΩ	½	9B1-83	BTS-100K	
R24	47Ω	½	9B1-46	BTS-47	
R25	1000Ω	½	9B1-48	BTS-1000	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R26	47KΩ	½	9B1-82		
R27	1000Ω	½	9B1-53	BTS-1000	
R28	47Ω	½	9B1-46	BTS-47	
R29	1000Ω	½	9B1-53	BTS-1000	
R30	47KΩ	½	9B1-82		
R31	150Ω	½	9B1-52	BTS-150	
R32	1000Ω	½	9B1-53	BTS-1000	
R33	1Meg	½	9B1-98		
R34	4700Ω	½	9B1-70		
R35	1Meg	½	9B1-98		
R36	47Ω	½	9B1-46	BTS-47	
R37	3900Ω	½	9B1-69		
R38	56000Ω	2	9B4-71		
R39	100KΩ	½	9B1-83		
R40	1000Ω	½	9B1-53		
R41	100KΩ	½	9B1-83	BTS-100K	
R43	47Ω	½	9B1-46	BTS-47	
R43	33KΩ	1	9B3-80	BTA-33K	
R44	1MEG	½	9B4-77	BTS-1M	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R45	680Ω	½	9B1-60	BTS-680	
R46	330KΩ	½	9B1-90	BTS-330K	
R47	150Ω	½	9B2-52	BTA-150	
R48	470KΩ	½	9B1-29	BTS-470K	
R49	1MEG	½	9B4-74		
R50A	330KΩ	½	† ITA-34212		
B	3.3Meg	½			
R51	560KΩ	½	9B1-86		
R52	100KΩ	½	9B1-84		
R53	22KΩ	½	9B1-78		
R54	1Meg	½	9B1-98		
R55	4700Ω	½	9B2-70		
R56	1000Ω	½	9B1-53		
R57A	22KΩ	½	• ITA-32276		
B	8200Ω	½			
C	8200Ω	½			
R58	47KΩ	½	9B1-82		
R59	82KΩ	½	9B1-85		
R60	3.3Meg	½	9B1-104		
R61	4700Ω	½	9B1-70		
R62	3.3Meg	½	9B1-104		
R63	100KΩ	½	9B1-83		
R64	330KΩ	½	9C12-1025	PW7-3300	
R65	22KΩ	½	9B1-78		
R66	560Ω	½	9B1-59		
R67	560Ω	½	9B1-59		

† Items R50A, R50B, C58A, C58B and C58C are combined in one unit.
• Items R57A, R57B, R57C, C58A, C58B and C58C are combined in one unit.
Note 1. Used only in chassis 21T25AS.
Note 2. Some versions use a single 2500Ω, 5 watt resistor in this application.
Note 3. Not used in chassis 21T18AGH, 21T27AGH, 21T27AS.
Note 4. Not used in chassis 21T25AS, 21T24AS, 21T27AS, 21T25AGH and 21T20AGH.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R68	330KΩ	½	9B1-92		
R69	82KΩ	½			
R70	820KΩ	½	9B1-97		
R71	330KΩ	½			
R72	330KΩ	½	9B1-89		
R73	100KΩ	½			
R74	22KΩ	½			
R75	560Ω	½			
R76	150KΩ	½	9B1-88		
R77	150KΩ	½			
R78	82KΩ	½	9B1-73		
R79	47KΩ	½	9B3-89		
R80	470KΩ	½	9B1-94		
R81	10Ω	½	9B1-50	BTS-100	
R82	82KΩ	2	9B4-73		
R83	1.5Ω	3	9C1-1065		
R84	2700Ω	3	9C11-1104		
R85	150KΩ	5		PW7-1500	Note 3
R86	1000Ω	5		PW7-1000	Note 3
R87	133Ω	15	9C-23973		
R88	2Ω		9EM-23018		
R89	220KΩ	½	9B1-90		Note 3
R90	330KΩ	½	9B1-92		
R91	220KΩ	½	9B1-27		
R92	5.6Ω				Note 4

TRANSFORMER (FILAMENT)

ITEM No	RATING PRI	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA RAYTHEON PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Stancor PART No	Thordarson PART No	Tried PART No
T1	115VAC	2.6VCT ⑤ 2.3A	⑤3.4A	12D-23699		P-3959		P-8130	26F67①	

① Drill one new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.
T2	Horiz. Output Trans.	C12E-23939			X126 *		FLY-80 *	
T3	Vert. Output Trans.	C12E-23726	Z1804	A-3037	V313	A-8123	26852	A-102X
T4A	Yoke-Horiz. (5.5MD)	20I-24183 ①	DF801⑤①	MDF-70⑤ ⑥	20ED1⑤⑦	T70F08/43 ⑤⑧	DY-8A⑤ ⑧	Y-2-1⑤ ⑧
B	Vert. (43MH)	20I-23744 ②	DF801⑤①	MDF-70⑤ ⑥	20ED1⑤⑦	T70F08/43 ⑤⑧	DY-8A⑤ ⑧	Y-2-1⑤ ⑧
		20I-24056 ③	DF801 ⑤①	MDF-70⑤ ⑥	20ED1⑤⑦	T70F08/43 ⑤⑧	DY-8A⑤ ⑧	Y-2-1⑤ ⑧
		20I-24563-1④						

① Used in chassis 21T24AS and 21T25AS.
② Alternate yoke used in chassis 21T24AGH.
③ Alternate yoke used in chassis 21T24AGH, 21T24AGN and 21T27AS.
④ Alternate yoke used in chassis 21T24AGS and 21T25AGH.
⑤ Use original rear cover and centering device.
⑥ Use original horizontal yoke damping network.
⑦ Use original yoke damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.	NOTES
T5	6.8KΩ	2.8Ω	12C-24170 ①	Z1004	A-3951	A-3878	26H53	S-5X	① Used in chassis 21T25AS, 21T27AS and 21T27AGH
	6.4KΩ	3.5Ω	12C-23704 ②	Z1113 ④	A-3026	A-3878④	32B46 ③	S-7X ④	② Used in chassis 21T24AS, 21T18AGH, 21T20AGH and 21T24AGH
			12C-24591 ③						③ Used in chassis 21T25AGH
									④ Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP	REPLACEMENT DATA RAYTHEON PART No.	CHIAM PART No.	NOTES
SP1	4"	PM	5.5Ω	18A-24163①②	4A07	① Models C-2166 & UC-2166 use two (2) 4"PM (part # 18A-24163) and one (1) 10" PM (part #18A-24176).
SP2	4"	PM	5.5Ω	18A-24183①	4A07	② Models C-2163 & UC-2163 use 4 PM (part #18A-24163) and 10" PM (Part #18A-21442).
SP3	10"	PM	3.5Ω	18A-24176 ①	10A6A	③ Models UM-2166A, UM-2160C, UM-2160Q, UM-2160K, UM-2160D, UM-2161F, UM-2163E, & UM-2163M use 5" PM (part #18A-21316).
	10"	PM	3.5Ω	18A-21442 ②	10A6A	④ Models UC-2164, M-2163 & UM-2165 use 6" PM (part #18A-21443).
	5"	PM	5.5Ω	18A-21315 ③	5A1	
	6"	PM	5.5Ω	18A-21443 ④	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1A	Ant. Coil	0Ω	0Ω	102S-24538-2				Channel 2
B	Ant. Coil	0Ω	0Ω	102S-24538-3				Channel 3
C	Ant. Coil	0Ω	0Ω	102S-24538-4				Channel 4
D	Ant. Coil	0Ω	0Ω	102S-24538-5				Channel 5
E	Ant. Coil	0Ω	0Ω	102S-24538-6				Channel 6
F	Ant. Coil	0Ω	0Ω	102S-24538-7				Channel 7
G	Ant. Coil	0Ω	0Ω	102S-24538-8				Channel 8
H	Ant. Coil	0Ω	0Ω	102S-24538-9				Channel 9
I	Ant. Coil	0Ω	0Ω	102S-24538-10				Channel 10
J	Ant. Coil	0Ω	0Ω	102S-24538-11				Channel 11
K	Ant. Coil	0Ω	0Ω	102S-24538-12				Channel 12
L	Ant. Coil	0Ω	0Ω	102S-24538-13				Channel 13
L2	Mixer Grid & Osc. Coils	0Ω		102S-24538				
L3	Mixer Grid & Osc. Coils	0Ω		102S-24525				
L4	1st. Video IF			13A-24203				Includes 100MMF cap. and 41.25MC trap
L5	Fil. Choke	0Ω		102S-24524				
L6	Conv. Plate	.1Ω		102S-24525				
L7	2nd. Video IF	.1Ω	.1Ω	13A-24224	17-5001 *	TV-125 *	5231 *	
L8	3rd. Video IF	.1Ω	.1Ω	13A-24234	17-5001 *	TV-126 ■	6233 ■	
L9	Series Peaking Coil	1.7Ω		16A-23437		19-1004	6632	7.8 Microhenries
L10	Shunt Peaking Coil	8.3Ω		16A-19365		19-4400	6136	410 Microhenries
L11A	4.5MC Trap	1.6Ω						
B	1st. Sound IF	3Ω		20I-23739				
L12	Series Peaking Coil	14Ω		16A-24375			6156	770 Microhenries
L13	2nd. Sound IF	.5Ω	.5Ω	20I-23873			6303	
L14	Quadrature Coil	4.8Ω		20I-23727	20-1005		1689	
L15	Horizontal Stabilizer	44Ω		13M-24641	20-1049 ▲	MWC-1	6234	
L16	Horiz. Osc.	83Ω		13E-24640				Tapped ⑤ 80Ω & 8 Microhenries
L17	RF Choke	1.5Ω		16A-21701	19-1006		4613	

* Cut out chasis hole and use adaptor plate.
■ Cut out chasis hole and use adaptor plate and detune trap.
▲ Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D C RESISTANCE	RATINGS INDUCTANCE @ CURRENT (1000 ⁻⁰₊₁)	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Tried PART No.
L18	.210ADC	37.4Ω	.5 HY	16A23889					

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA RAYTHEON PART No.	FEDETAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.240ADC	21J23840	1236A	MR-300	85-306	6Q4	300	
M2	.240ADC	21J23840	1236A	MR-300	85-306	6Q4	300	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M3	CK706		1N60/1N12	Video Detector

RAYTHEON MODELS C-2163, C-2166, M-2163, UC-2163, UC-2164, UC-2166, UM-2160A, C, G, K, UM-2160D, F, UM-2163E, L, M, UM-2165, C (Ch. 21T19AGH, 21T20AGH, 21T24AGH, AS, 21T25AGH, AS, 21T27AGH, AS)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M4	Pilot Light		Chassis 21T24AGH, 21T27AGH, 21T25AGH
M5	Tuner	211-24246	VHF- Chassis 21T25AS, 21T24AS, 21T27AS
M6	Tuner		UHF-VHF - Used in UHF models
M7	Trap	102S-24532	VHF Ant. Input Filter - Chassis 21T25AS, 21T24AS, 21T27AS
	Trap	103G-24800	VHF Ant. Input Filter - Chassis 21T19AGH, 21T27AGH, 21T20AGH, 21T24AGH, 21T25AGH
M8	Video Det. Assy.	13B-24206	Includes M3, coils and capacitors
M9	Switch		Fringe-local - Chassis 21T24AS, 21T27AS, 21T19AGH, 21T20AGH, 21T24AGH, 21T27AGH, 21T25AGH
M10	Centering Device	16M-23770	
M11	Ion Trap	16M-19706	
M12	Correction Magnet	16M-22607	Models M-2165, C-2166, UM-2165, UC-2166
	Correction Magnet	16M-21526	Models C-2163, UC-2164, UC-2163
B2	Trimmer Cap.		Horiz. Drive (80-480MMF) Chassis 21T25AS only
	Cabinet	24D-24093	Model C-2163 (Mahogany)
	Cabinet	24D-24108	Model C-2163 (Blonde)
	Cabinet	24D-24150	Model M-2165 (Mahogany)
	Cabinet	24D-24151	Model M-2165 (Blonde)
	Cabinet	24D-24143	Model C-2166 (Mahogany)
	Cabinet	24D-24152	Model C-2166 (Blonde)
	Cabinet	24D-24318	Model UM-2165 (Mahogany)
	Cabinet	24D-24319	Model UM-2165 (Blonde)
	Cabinet	24D-24321	Model UC-2166 (Mahogany)
	Cabinet	24D-24322	Model UC-2166 (Blonde)
	Cabinet	24D-24396	Model UC-2164
	Cabinet	24D-24327	Model UC-2163 (Mahogany)
	Cabinet	24D-24328	Model UC-2163 (Blonde)
	Case	200-24288-1	Model UM-2160A
	Case	200-24288-2	Model UM-2160G
	Case	200-24288-3	Model UM-2160K
	Case	200-24288-4	Model UM-2161F
	Case	200-24288-6	Model UM-2162E
	Case	200-24288-7	Model UM-2162L
	Case	200-24288-8	Model UM-2162M
	Case	200-24288-9	Model UM-2161D
	Case	200-24288	Model UM-2165C
	Knob	5B-24283-A157	Fine tuning - Model UC-2164
	Knob	5B-24283-A93	Fine tuning - Models UM-2160A, UM-2160C, UM-2160G, UM-2160K, UM-2161F, UM-2161D, UM-2162E, UM-2162L, UM-2162M
	Knob	5B-24136-A29	VHF Fine tuning - Models C-2163, M-2165, C-2166
	Knob	5B-24280-A29	Fine tuning - Models UC-2163, UM-2165, UC-2166
	Knob	5B-24137-A76	VHF Channel Sel. - Models M-2165, C-2166, C-2163 (Mahogany)
	Knob	5B-24137-A56	VHF Channel Sel. - Models M-2165, C-2166, C-2163 (Blonde)
	Knob	5B-24282-A76	VHF channel Sel.-Model UC-2164
	Knob	5B-24282-A93	VHF Channel Sel. - Models UM-2160A, UM- 2160C, UM-2160G, UM-2160K, UM-2161F, UM-2161D, UM-2162E, UM-2162L, UM-2162M
	Knob	5B-24279-A76	VHF Indicator-Models UM-2165, UC-2166, UC-2163 (Mahogany)
	Knob	5B-24279-A56	VHF Indicator- Models UM-2165, UC-2166, UC-2163 (Blonde)
	Knob	5B-24281-A29	UHF Indicator - Models UC-2163, UM-2165, UC-2166
	Knob	5B-24276-A29	UHF Indicator - Models UM-2160A, UM-2160C, UM-2160G, UM-2160K, UM-2161F, UM-2161D, UM-2162E, UM-2162L, UM-2162M, UC-2164
	Knob	5B-24138-A29	Picture - Models C-2163, M-2165, C-2166
	Knob	5B-23808-A157	Picture - Model UC-2164
	Knob	5B-23787-A93	Picture - Models UM-2160A, UM-2160C, UM-2160G, UM-2160K, UM-2161F, UM-2161D, UM-2162E, UM-2162L, UM-2162M
	Knob	5B-24139-A76	On-off-volume - Models M-2165, C-2166, C-2163, UM-2165, UC-2166, UC-2163 (Mahogany)
	Knob	5B-24139-A56	On-off-volume - Models M-2165, C-2166, C-2163, UM-2165, UC-2166, UC-2163 (Blonde)
	Knob	5B-23809-A76	On-off-volume - Model UC-2164
	Knob	5B-23786-A93	On-off-volume - Models UM-2160A, UM-2160C, UM-2160G, UM-2160K, UM-2161F, UM-2161D, UM-2162E, UM-2162L, UM-2162M
	Knob	5B-21205-A76	Horiz. Hold & treble - Models M-2165, C-2166, UM-2165, UC-2166, UC-2163 (Mahogany)
	Knob	5B-21205-A56	Horiz. Hold and Treble - Models M-2165, C-2166, C-2163 (Blonde)
	Knob	5B-21206-A76	Vert. Hold & Bass - Models M-2165, C-2166, C-2163, UM-2165, UC-2166, UC-2163 (Mahogany)
	Knob	5B-21206-A56	Vert. Hold & Bass - Models M-2165, C-2166, C-2163, UM-2165, UC-2166, UC-2163 (Blonde)
	Knob	5B-21134-A76	Tone & brightness - Models M-2165, C-2166, C-2163, UM-2165, UC-2166, UC-2163 (Mahogany)
	Knob	5B-21134-A56	Tone & brightness - Models M-2165, C-2166, C-2163, UM-2165, UC-2166, UC-2163 (Blonde)
	Knob	5B-23839-A76	Vert. Hold, horiz. hold & brightness - Model UC-2164
	Knob	5B-23805-A93	Vert. Hold, horiz. hold & brightness - Models UM-2160A, UM-2160C, UM-2160G, UM-2160K, UM-2161E, UM-2161D, UM-2162E, UM-2162L, UM-2162M
	Safety Glass	30M-23709	Models C-2163, UM-2160C, UM-2160A, UM-2160G, UM-2160K, UM-2161D, UM-2161F, UM-2162E, UM-2162L, UM-2162M, UC-2164, UC-2163
	Safety Glass	30M-21485	Models UM-2165, UC-2166, M-2165, C-2166
	Mask	200-24378	Models M-2165, C-2166
	Mask	25M-23961	Models UM-2165, UC-2166

PROPERTY OF
L. F. BLANKENSHIP
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V11, V12, V13 and V14. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C80, C81, C82, C78, R82 and other associated components.	Check L15, L16, C70, C74, C75, C77, R75, R74, R78, R79 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V12 and V13. Check M1 and M2. Check adjustment B2. Check R88, R82, C77 and other associated components.

BLOOMING

Check by substitution V12, V13 and V14. Check M1 and M2. Check C77, C81, R82, R88 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

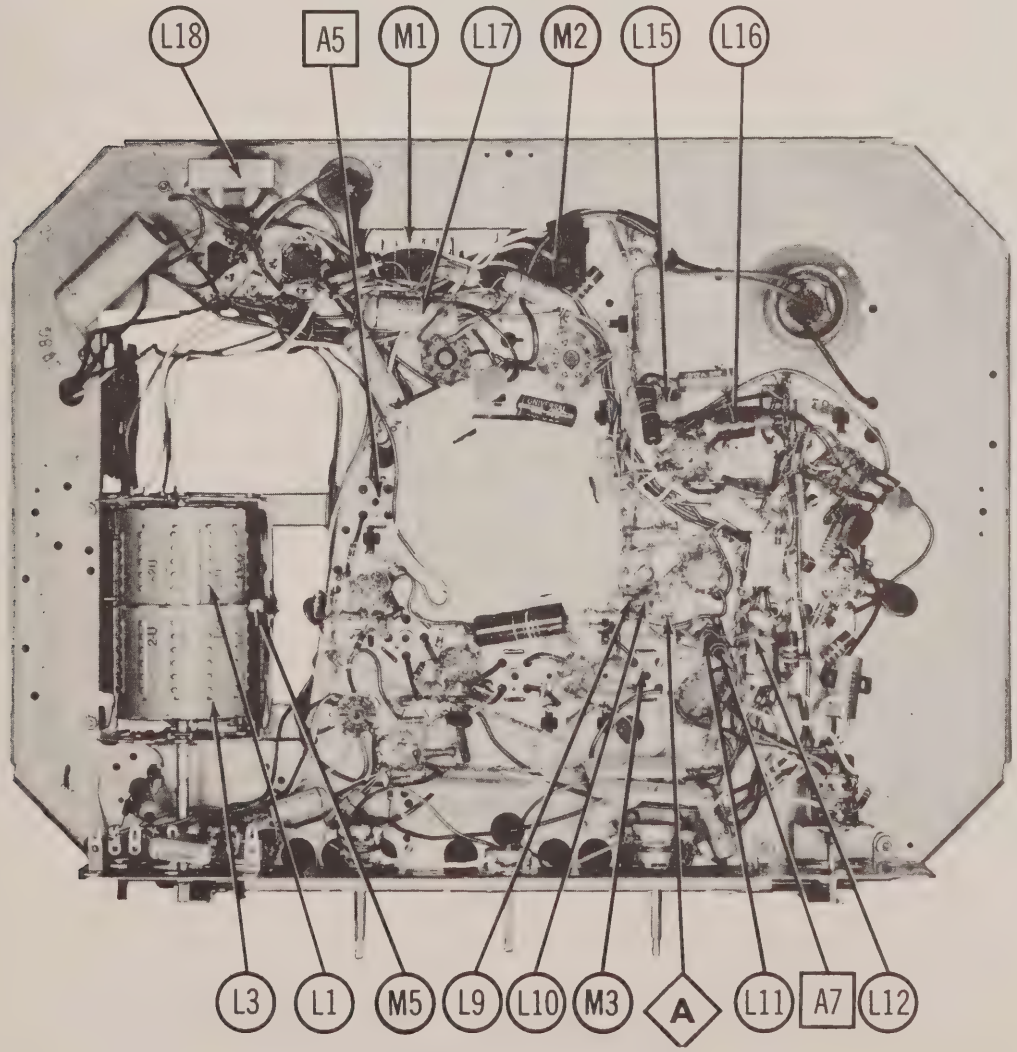
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW- INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

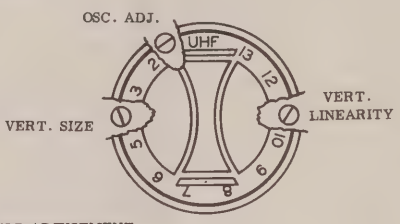
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal molding at the bottom of the safety glass. Remove metal molding and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis . (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

FOR CHASSIS 21T25AS

To adjust the horizontal oscillator circuit remove the rear cover and supply power to the set. Set the horizontal hold control at its mid-range position and adjust the horizontal stabilizer coil (L15) until picture synchronizes horizontally.

FOR CHASSIS 21T24AS, 21T27AS, 21T19AGH, 21T20AGH, 21T24AGH, 21T25AGH OR 21T27AGH

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Set the horizontal hold control at its mid-range position and adjust the horizontal oscillator coil (L16) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R7) located on top of the chassis for maximum sound and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

BUILT-IN ANTENNA TUNING

Built-in antenna can be adjusted from rear of the cabinet. Adjust for a picture of maximum contrast and minimum ghosts.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnet so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL - CONSOLE MODELS

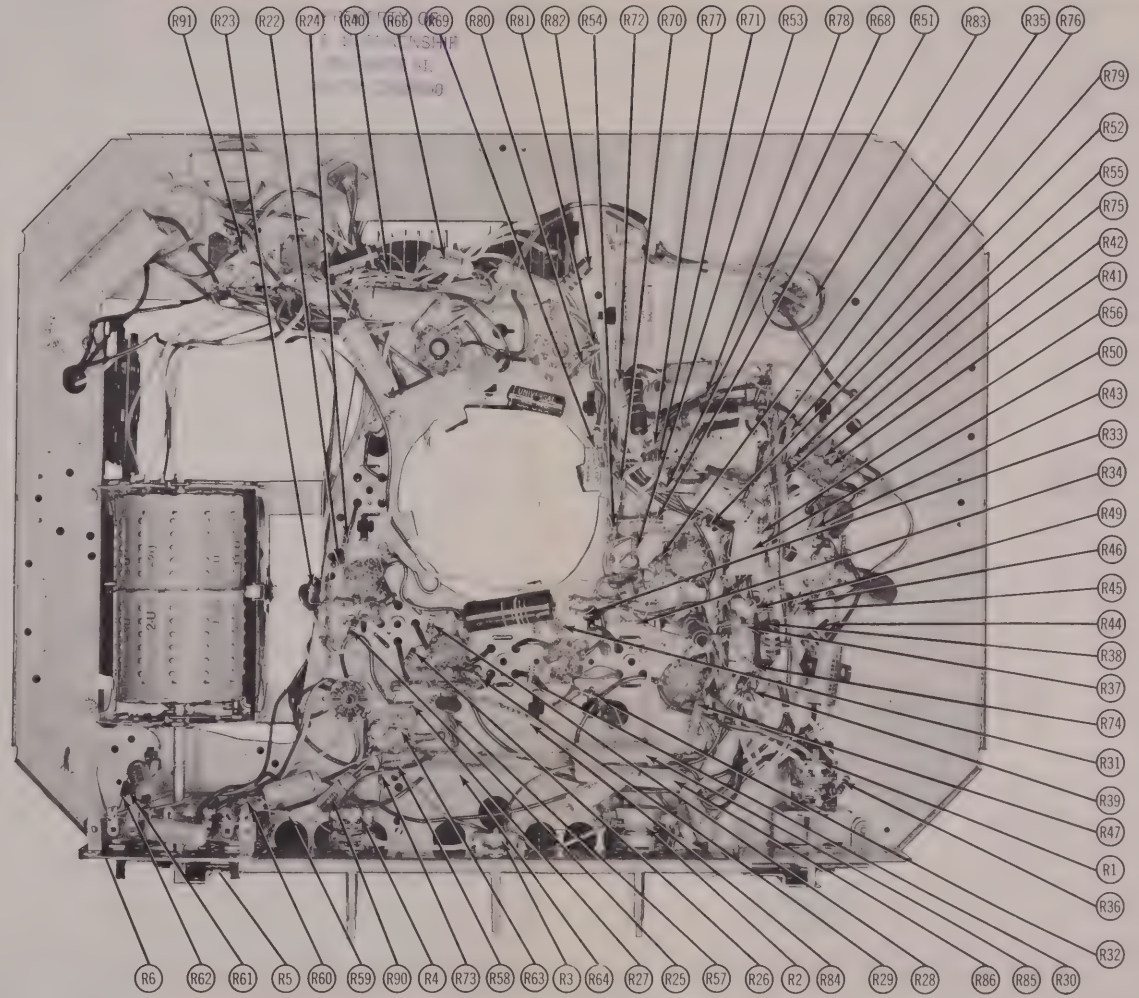
1. Remove 9 push-on type control knobs from front panel of cabinet.
2. Remove 2 screws from behind picture and channel selector knobs.
3. Remove 10 wood screws. Remove rear cover.
4. Remove 2 wood screws. Remove antenna and interlock bracket.
5. Disconnect yoke plugs, HV leads and speaker leads.
6. Remove 5 chassis bolts. Remove chassis.

NOTE: On receivers where chassis is mounted from bottom, turn cabinet completely over on its top on a soft surface before removing chassis bolts.

7. Remove 8 speaker nuts. Remove 3 speakers.

CABINET REMOVAL - TABLE MODELS

1. Remove 9 push-on type control knobs from top panel of cabinet.
2. Remove 4 screws. Remove rear cover.
3. Place cabinet face down on a soft surface.
4. Remove 2 screws. Remove antenna and interlock bracket.
5. Disconnect speaker leads.
6. Remove 6 screws around the cabinet front (NOTE: The 6 screws must be replaced as removed, the 2 short screws must be replaced at the top and the bottom).
7. Remove 4 screws at the top and bottom of cabinet (top screws are within indicator disks).
8. Lift cabinet straight up.
9. Remove speaker nuts. Remove speaker(s).



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

RETMA MEMBER RADIO-ELECTRONICS-TELEVISION MANUFACTURERS ASSOCIATION

PROPERTY OF
L. F. BLANKENSHIP
57
COLORADO

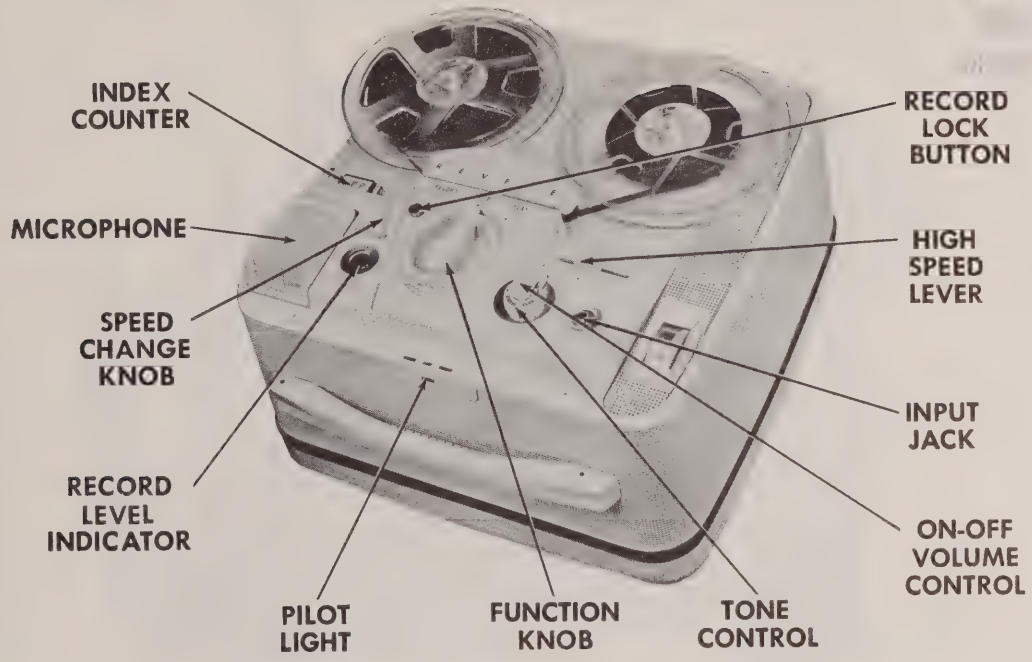


Figure 1

GENERAL INFORMATION

These Revere Tape Recorders are of the same basic design and construction. There are variations in the power input requirements and some have additional or extra features. The major differences in the various models are listed below:

Model No.	Line Voltage	Tape Speed	Model No.	Line Voltage	Tape Speed
T-900	120, 60~	3 3/4	TR-1000	120, 60~	3 3/4
TS-905	120, 50~	3 3/4	TRS-1005	120, 50	3 3/4
TS-925	230, 50~	3 3/4	TRS-1025	230, 50~	3 3/4
TS-926	230, 60~	3 3/4	TRS-1026	230, 60~	3 3/4
T-1100	120, 60~	3 3/4-7 1/2	TR-1200	120, 60~	3 3/4-7 1/2
TS-1105	120, 50~	3 3/4-7 1/2	TRS-1205	120, 50~	3 3/4-7 1/2
TS-1125	230, 50~	3 3/4-7 1/2	TRS-1225	230, 50~	3 3/4-7 1/2
TS-1126	230, 60~	3 3/4-7 1/2	TRS-1226	230, 60~	3 3/4-7 1/2
T-1400	120, 60~	3 3/4			
TS-1405	120, 50~	3 3/4	Above Models Contain Built-in Radio.		
TS-1425	230, 50~	3 3/4			
TS-1426	230, 60~	3 3/4			

On the serial nameplate, located on the rear of the case, there appears the model number, along with the speed, current and voltage at which that particular unit is designed to operate.

CAUTION: Do Not Use On Direct Current. Before connecting recorder to line supply be absolutely certain that it agrees with the above specifications.

Manufactured by:

Revere Camera Company
320 East Twenty-First Street
Chicago 16, Illinois

REVERE MODELS TR-1000, TR-1200, TRS-1005, TRS-1025, TRS-1026, TRS-1205, TRS-1225, TRS-1226, TS-905, TS-925, TS-926, TS-1105, TS-1125, TS-1126, TS-1405, TS-1425, TS-1426, T-900, T-1100

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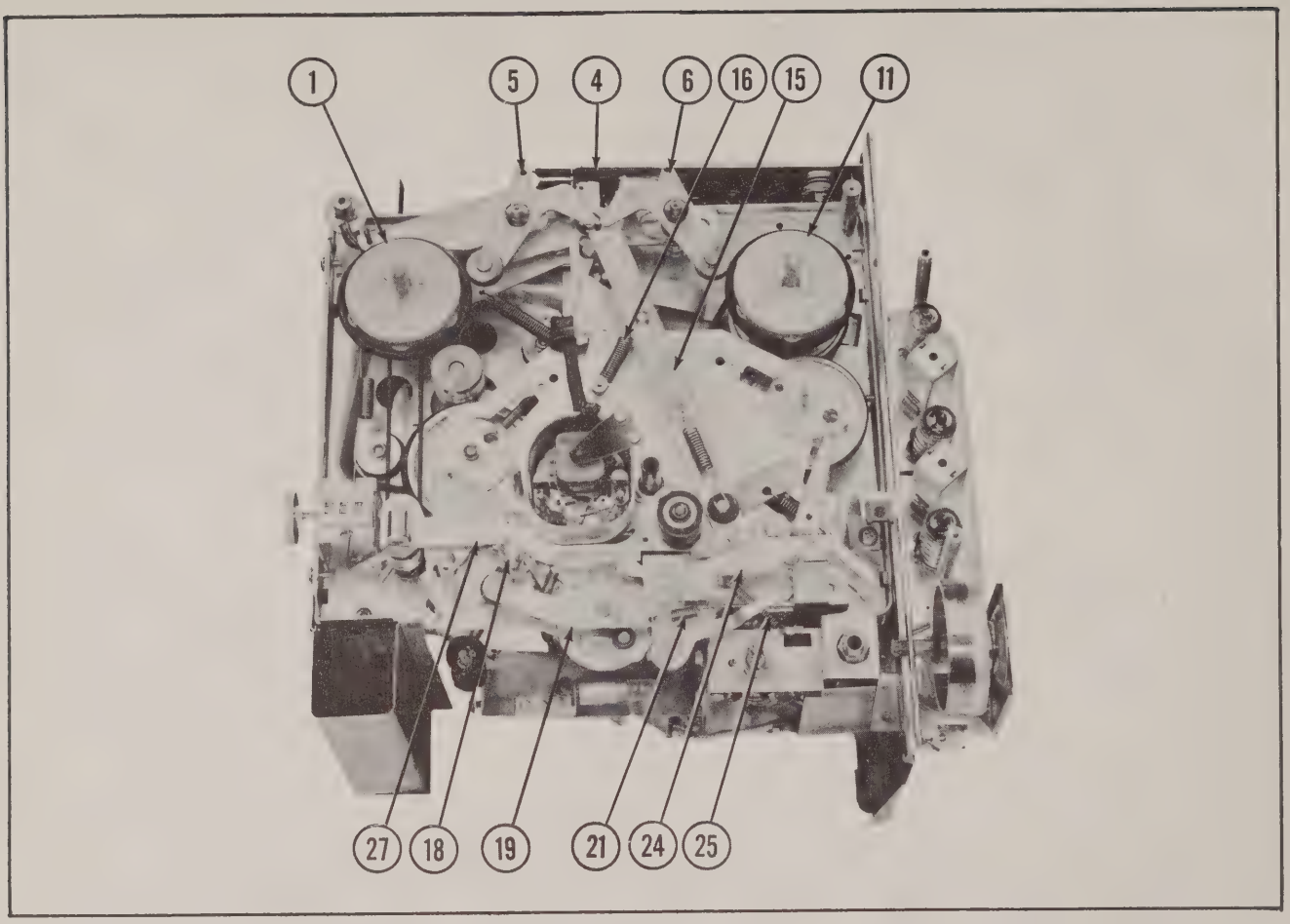

Figure 2

SPECIFICATIONS

Weight-

27 lbs. (approx.)

Size-

9 1/2 x 14 x 13 1/2 inches (approx.)

Reel Size-

Up to 7 inch.

Tracks-

Dual

Track Selection-

Manual turnover.

Tape Loading-

Drop-in-slot type.

Tape Speed-Play and Record-

7 1/2 and 3 3/4 inches per second. Some Models have 3 3/4" speed only.

Fast Forward-

7" reel in 90 seconds. (approx.)

Fast Rewind-

7" reel in 90 seconds. (approx.)

Recording Time(7" reel)-

1 hour at 7 1/2 ips. (1/2 hour each track).
2 hours at 3 3/4 ips. (1 hour each track).

Frequency Response-Models T-1100 & TR-1200-

±3db, 85 to 7000 cps. at 3 3/4 ips.
±3db, 75 to 12,000 cps. at 7 1/2 ips.

FUNCTIONS OF THE CONTROLS
(Refer to Figure 1)

On-Off Volume Control-

Turning this control clockwise supplies power to the entire recorder and regulates the volume for both the recording and play back operations.

Function Knob-

All electrical and mechanical functions for the Play and Record operations are performed by this single 3-position knob. Also, for convenience and protection, the Function Knob is returned to "Stop" when the power switch is turned off. This disengages all pressure pads and rubber wheels for safe storage of the instrument.

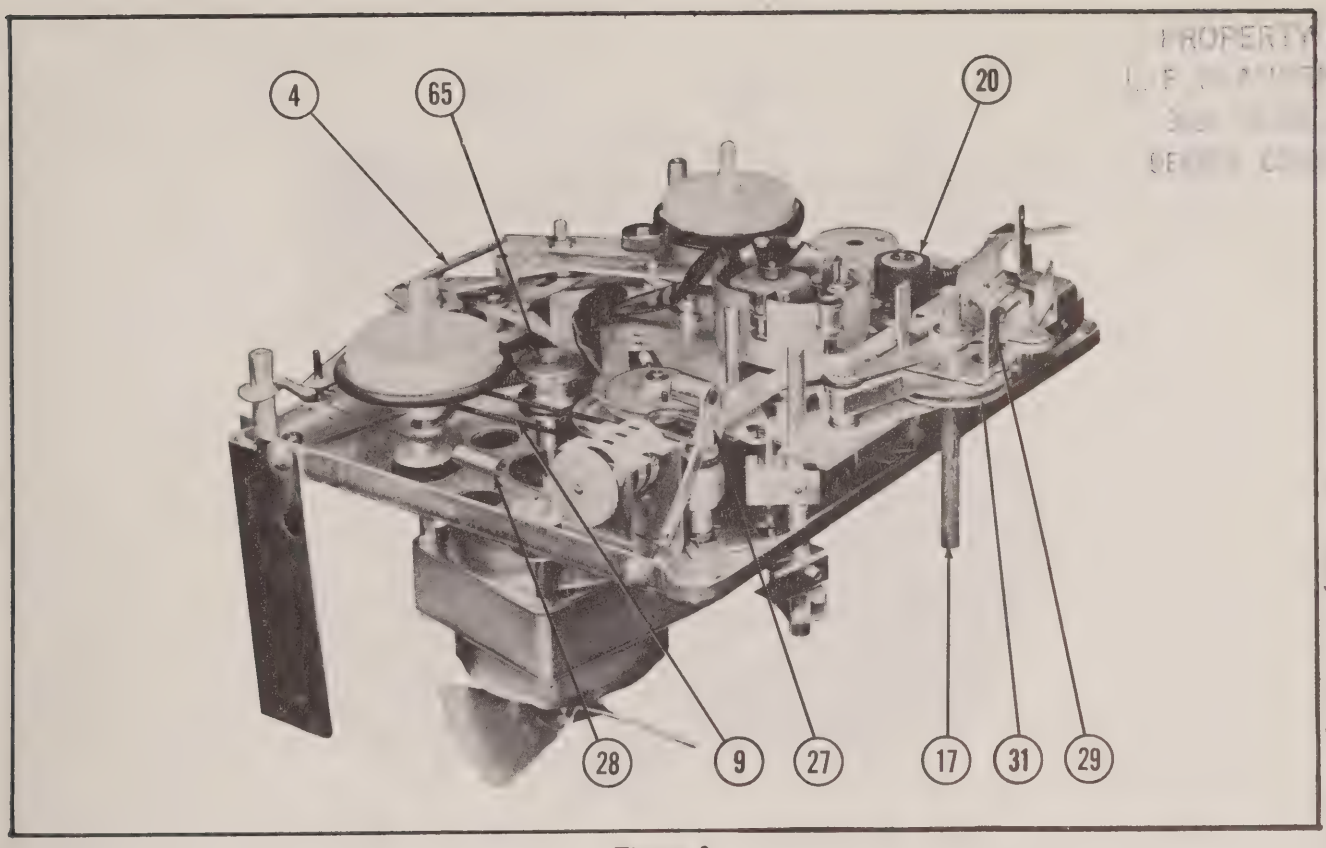

Figure 3

Speed Change Knob-

This knob can be turned to either 3 3/4 ips., slow speed, "S" or 7 1/2 ips., fast speed, "F" while machine is in any function. Insofar as quality of recording-reproduction is concerned, the higher the speed, generally, the greater will be the fidelity.

Record Lock Button-

This button must first be depressed before the Function Knob can be placed in the "Record" position, thus preventing accidental erasure.

Instant Stop Button-

This button is provided to instantly stop the tape in either "Record" or "Play". Examples of its use are: To prevent recording of unwanted breaks in radio programs; to hold back the tape for noiseless instantaneous starts in either "Record" or "Play"; to precisely preset the record level while the Function Knob is in "Record"; to momentarily stop tape while transcribing.

High-Speed Lever-

This control is used to skip ahead to any point on the tape or to rewind tape onto the supply reel. By moving this control to the right the tape will move ahead at high speed while moving it to the left will rewind the tape at high speed.

Index Counter-

Set the counter to zero at the beginning of a reel by turning back its knurled knob. When a recording is started, note the counter reading. This will enable selections to be located instantly in the future.

OPERATING INSTRUCTIONS

Preparing for Operation-

1. Secure the line cord socket in the slot provided at the back of the case and plug the line cord plug into a convenient wall receptacle of the proper rating.

2. Place a reel of tape on the left spindle and an empty reel on the right spindle, making sure the reels are fully seated.

3. Unwind about 14" of tape from the left-hand reel. Hold a section of tape straight with both hands and drop it into tape slot. Make sure the dull coated side of the tape faces the rear of the recorder.

4. Feed the end of the tape into one of the radial slots in the empty reel. Rotate the reel counterclockwise until the tape is secured and all slack is taken up between reels.

To Record From Microphone-

1. Insert the microphone plug into the Input Jack, making certain it is all the way down.

2. Set the Index Counter to zero. This enables you to rewind to the exact start of a recording.

3. While talking into the microphone, adjust the Volume Control until the "Normal" indicator flashes and no flashing occurs at the "Distort" indicator.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the "Normal" indicator to flash, will result in weak playback and high background noise. Too strong

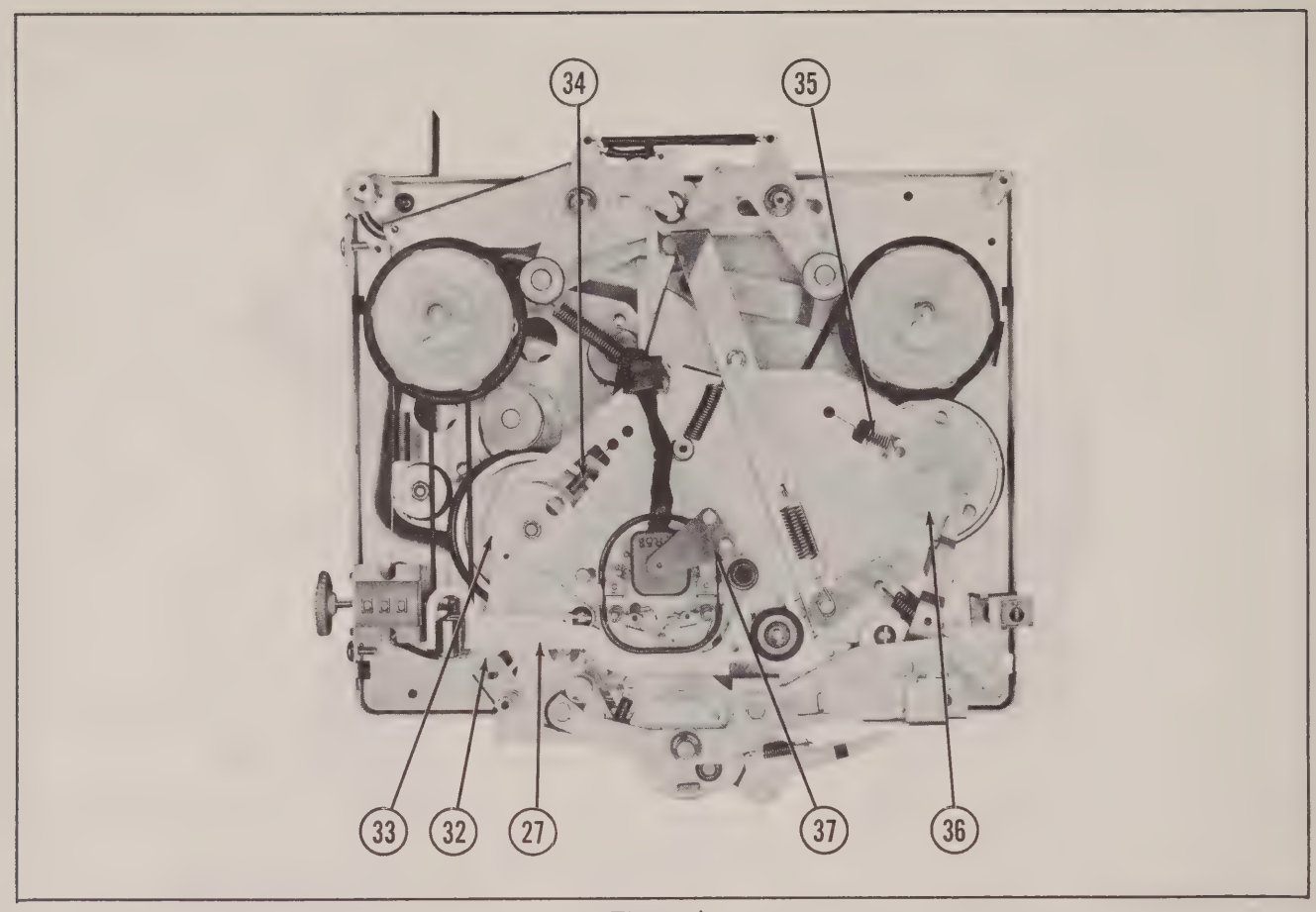

Figure 4

a signal, causing the "Distort" indicator to flash, will result in distortion during playback.

4. While holding the Record Lock Button in its depressed position, turn Function Knob fully counterclockwise.

To Record From Built-In Radio-

No external connections are needed. Remove any plug from the Input Jack and set the record level as described under "To Record From Microphone".

To Record From Ext. Radio Or T. V. -

Recordings can be made from a radio or television receiver by placing the microphone near the loudspeaker, however, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which, as a result, will be recorded on the tape. A superior quality recording can be made by connecting the attachment cord, supplied with the recorder, as follows:

1. Insert the cord plug into the Input Jack of the recorder.

2. Connect the cord clips to the radio or T. V. speaker terminals.

3. Proceed with recording as described under "To Record From Microphone".

To Record From Phonograph-

Most crystal or magnetic type phonographs have a standard phone plug that can be plugged directly into the Input Jack, otherwise, the attachment cord may be used by connecting as follows:

1. Insert the cord plug into the Input Jack.

2. Connect cord clips to the pick-up leads on the phonograph.

NOTE: Should a hum develope from this connection, reverse the cord clips on the pick-up leads.

3. Proceed with the recording as described under "To Record From Microphone."

Twin Track Recording-

1. These recorders are designed so that a reel of tape will hold two full length recordings, one on each half of the dull side of the tape.

2. After the first track has been recorded, a second track of material may be recorded on the same tape, without rewinding. Remove the full reel from the right spindle, turn it over and place on the left spindle.

3. Thread the tape and proceed with the recording as previously described.

4. After the second track has been recorded, the first track is ready to be played without rewinding, by changing reels as described under No. 2 above.

Splicing And Editing-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings

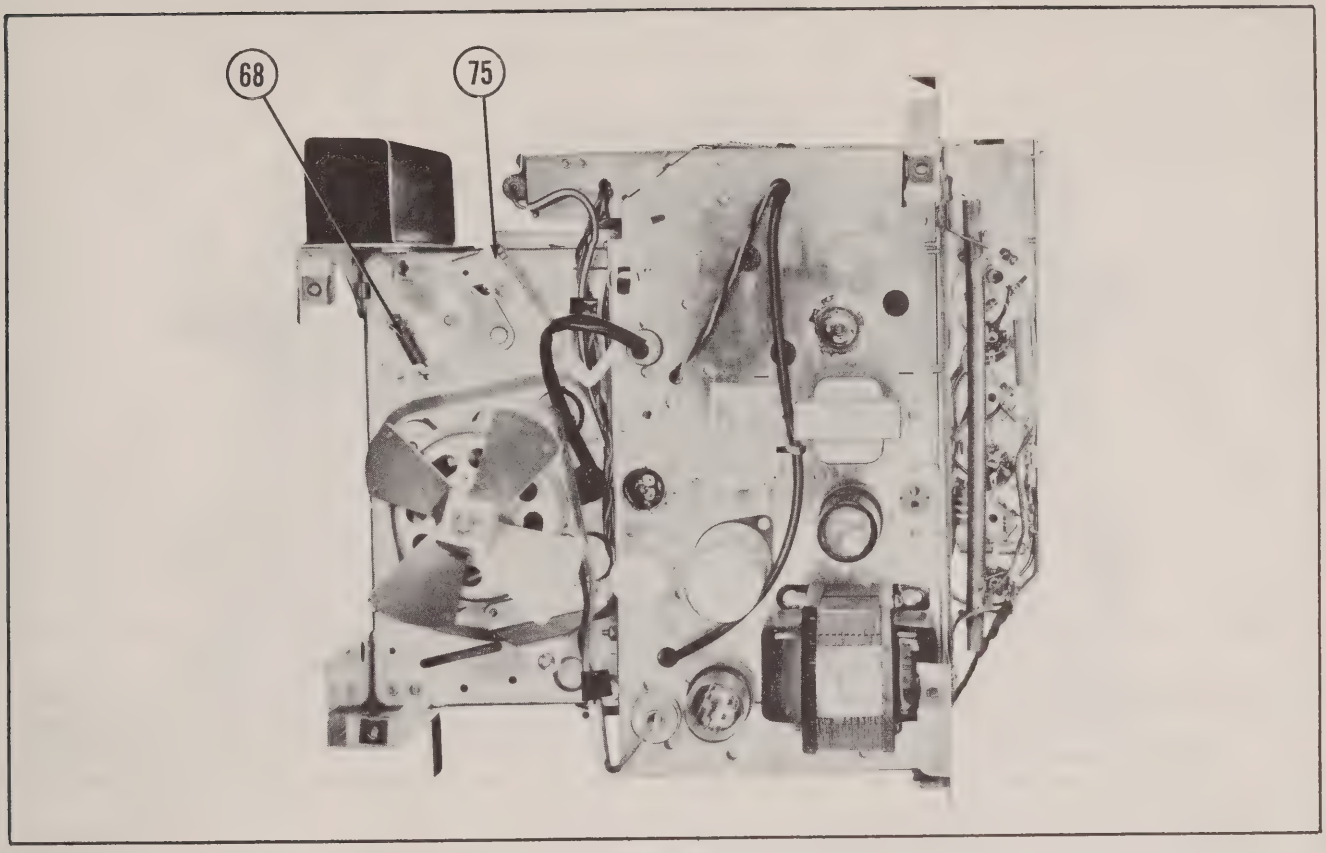

Figure 5

which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

(a)Cut tape at 60° angle with an overlap so ends will line up. (Cutting tape at an angle will eliminate detection of splice on recording.)

(b)Align both ends of tape, with glossy side up.

(c)Cover aligned ends with splicing tape, evenly and securely.

(d)Trim off excess splicing tape. (Cut into the recording tape very slightly.) This eliminates possibility of a sticky splice.

To Rewind Tape-

1. The tape may be rewound at any time by moving the high speed lever (47) to the left.

2. By moving the high speed lever back and forth the tape can be inched along to the number previously noted on the Index Counter.

3. After reaching the desired portion of the tape, move the high speed lever (47) to the middle or neutral position to stop all movement of the tape.

Fast Forward-

1. Any portion of a recording may be skipped, or any recording may be located in a few seconds by moving the high speed knob to the right. A few seconds of "Fast Forward" is equivalent to several minutes of playing time.

2. By moving high speed knob back and forth the tape can be inched along to an exact point.

3. After reaching the desired portion of the tape move the high speed knob to the middle or neutral position to stop all tape movement.

NOTE: The "Fast Forward" or "Rewind" mechanism can be engaged while the recorder is in either "Play" or "Record" position and the Function Knob will automatically return to the "Stop" position.

To Play A Recording-

1. Turn the Function Knob to "Play" position and adjust Volume and Tone Controls to the desired listening level.

To Listen To Built-In Radio-

1. With plugs removed from the Input Jack and the Function Knob in "Stop", the radio is directly connected for listening. To disconnect radio, while in "Stop", any plug can be inserted into the Input Jack or the radio can be tuned off the Station.

PRELIMINARY TESTS-REPAIR PROCEDURE

TEST PROCEDURE: FAILURE TO PASS ANY OF THESE TESTS INDICATES A FAULT THAT SHOULD BE REMEDIED.

1. Remove front and rear plastic head covers by pulling up. Clean head, tape guides, and capstan with

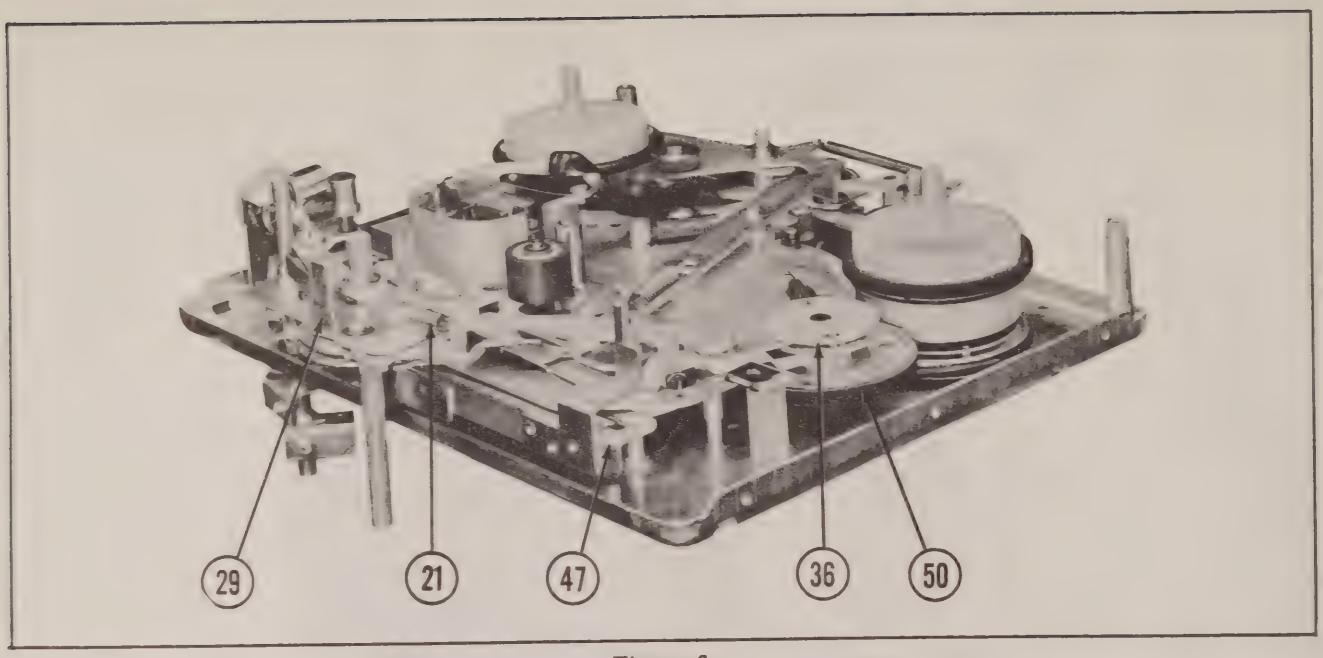

Figure 6

carbon tetrachloride or alcohol.

2. Place high speed lever in middle or neutral position. Turn on-off volume control to "On" position .

3. Thread tape on recorder. Place a reel of "A Wind" (glossy side out) tape on the left spindle. Pull off about 14" of tape. Brakes are engaged. Pull required on 7" reel should not distort the tape and should offer sufficient drag to prevent spilling of tape. Drop tape into threading slot. Attach free end of tape to take-up reel (right). Reel should rotate freely counterclockwise and drag when rotated clockwise.

4. Turn function knob to "Play". Felt pressure pads should press square against tape and cover shiny pole face area under tape. Pressure roller (20) should contact capstan and tape should move past the play-record-erase head at playing speed. Take - up reel should wind up tape as it passes capstan. The index counter should tally each revolution of the supply reel .

5. Move high-speed lever to the right or left and check to see that the function knob is automatically returned to "Stop" position; pressure roller and pressure pads should also be released. Tape should move at a greatly increased speed.

6. Return high-speed lever to neutral. Tape should stop without spilling or breaking.

7. Connect microphone and make a microphone recording. With tone control in treble, adjust volume control while speaking so that "Normal" half of Record Level Indicator flashes and "Distorted" does not . Depress Record Lock Button and turn the function knob to "Record" position. On Models T-1100, TS-1105, TS-1125, TS-1126, TR-1200, TRS-1205, TRS-1225, and TRS-1226, turn speed change knob to make recordings at both speeds.

8. Rewind tape by moving high-speed lever to the left. The function knob should automatically return to "Stop" position.

9. Play back the recording. Check the volume, tone, and overall quality. Check at both speeds on Models T-1100, TS-1105, TS-1125, TS-1126, TR-1200 , TRS-1205, TRS-1225, and TRS-1226. Amplification at full volume should be sufficient on normally recorded tape to deliver approximately 5 watts output and overload.

10. Check instant stop button by pressing while machine is in "Play" position. Tape should stop instantly. Upon releasing button tape should start instantly and not spill off reels.

11. Rewind tape; re-record over your previous recording. All trace of previous recording should be erased on the portion of tape re-recorded. Check irregularities in the playing speed. (Wow and Flutter) .

DISASSEMBLY INSTRUCTIONS

Removal Of Top Plate Assembly-

Most service work on the tape drive mechanism can be accomplished by removing the top plate as follows:

1. Pull up to remove the plastic Function Knob, Volume Control, Tone Control Knob and Rear Head Cover. Remove High Speed Knob by removing set screw at rear of knob.

2. Remove 8 top plate screws, two cross head wood screws in front of the control panel. Remove one screw located to the right of the high speed knob and 5 screws from between spindles.

3. Hold in instant stop button, tap and pry top plate assembly up starting at the rear. (On radio model tape recorders remove radio perforated top plate before attempting to remove main top plate assembly).

Removal Of Recorder From Case-

The recorder must be removed from the case in order to gain access to the amplifier components and to the under side of the tape transport mechanism.

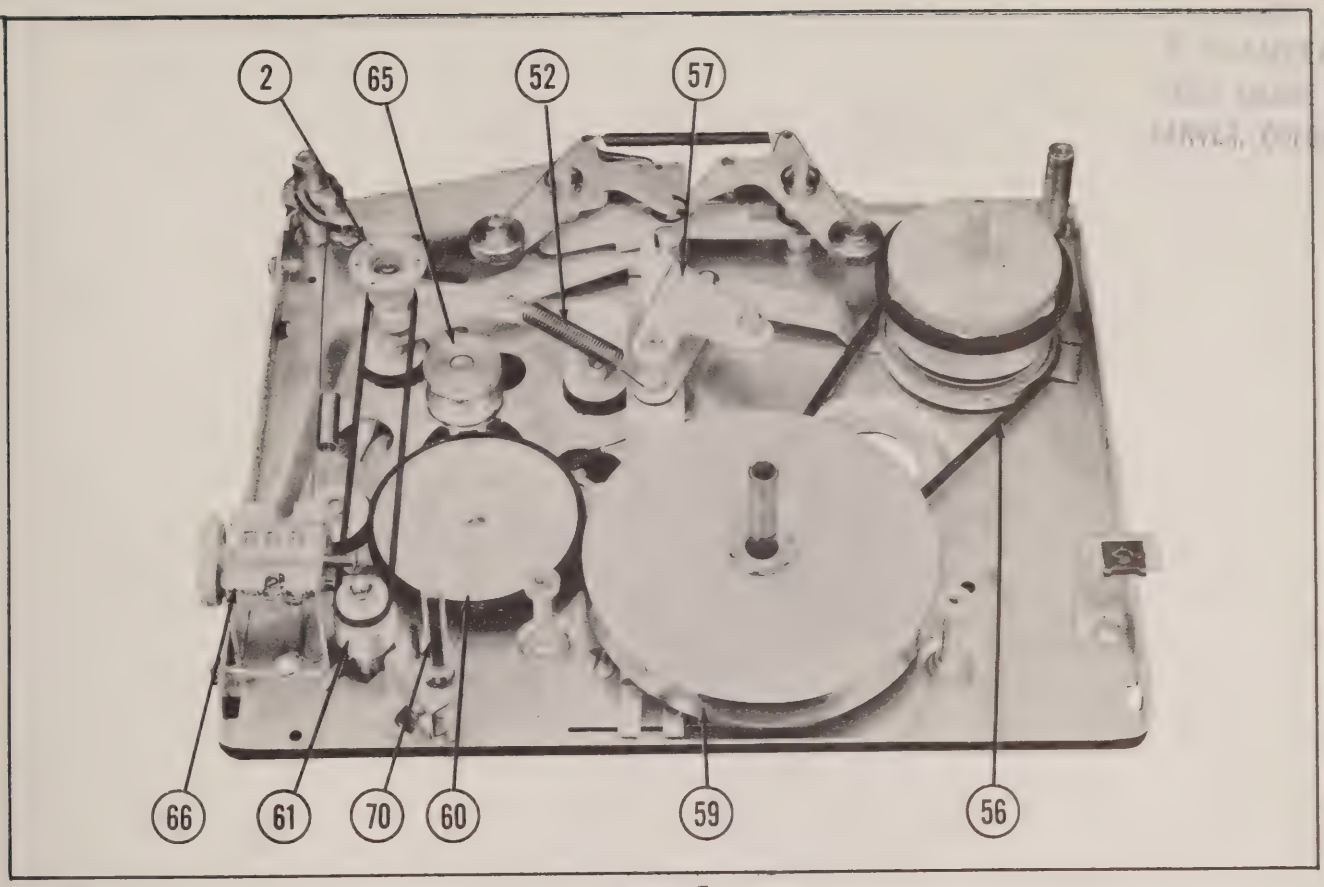

Figure 7

NOTE: To replace tubes, simply remove the bottom cover. Tubes on the radio section can be replaced by removing the top radio panel.

1. Remove large screw with cup washer located below Output Jack at rear of case.

2. Remove two small screws attaching rear name plate.

3. Remove 5 large cross head screws near the right and left sides of the bottom Tube Replacement Grille.

4. Lift the unit carefully up out of the case. The speakers remain with the case and the speaker cable is only about 1 foot long.

5. Unplug speaker cable. (On radio models particular care should be taken in lifting the unit out of the case. This is to prevent damage to the Ferrite Rod Antenna, located bottom right side.

Removal Of Amplifier From Transport Mechanism-

This is done to expose amplifier parts.

1. Disconnect head plug and motor plug Both plugs are located at the bottom of the amplifier chassis.

2. Remove speed equalization switch actuating arm (75).

3. Remove 3 large cross slot screws on the right compartment panel (first of the 4 screws need not be removed).

4. Remove 2 nuts holding left side of amplifier to mechanism.

ADJUSTMENTS

Play-Record Head Alignment Adjustment-

It is very important that the head be lined up perfectly with the tape. If it is not, low output and loss of high frequencies will result. There is one adjustment to be made which is as follows:

1. For alignment of the play-record head a 1 mil alignment tape should be used. Thread tape on unit and set controls in "Play" position. Adjust head for maximum treble tone by turning adjustment screw (38A). See Figure 4. In lieu of alignment tape, play a previously recorded tape and adjust head for maximum treble tone . After adjustment is made, cement alignment screw (38A) to lock adjustment.

Replacing Pressure Pads-

The felt pressure pads which hold the tape in firm contact with the play-record-erase head may be glued on, if necessary, with household cement without removing pressure pad arms (40 & 41). Pads should cover shiny pole faces of head, and side of pad touching head should be free of cement.

TROUBLES

Fails To Erase-

1. Pressure pad spring (42) weak or broken resulting in the pressure pad not holding tape firmly against erase head element. Replace spring (42) .

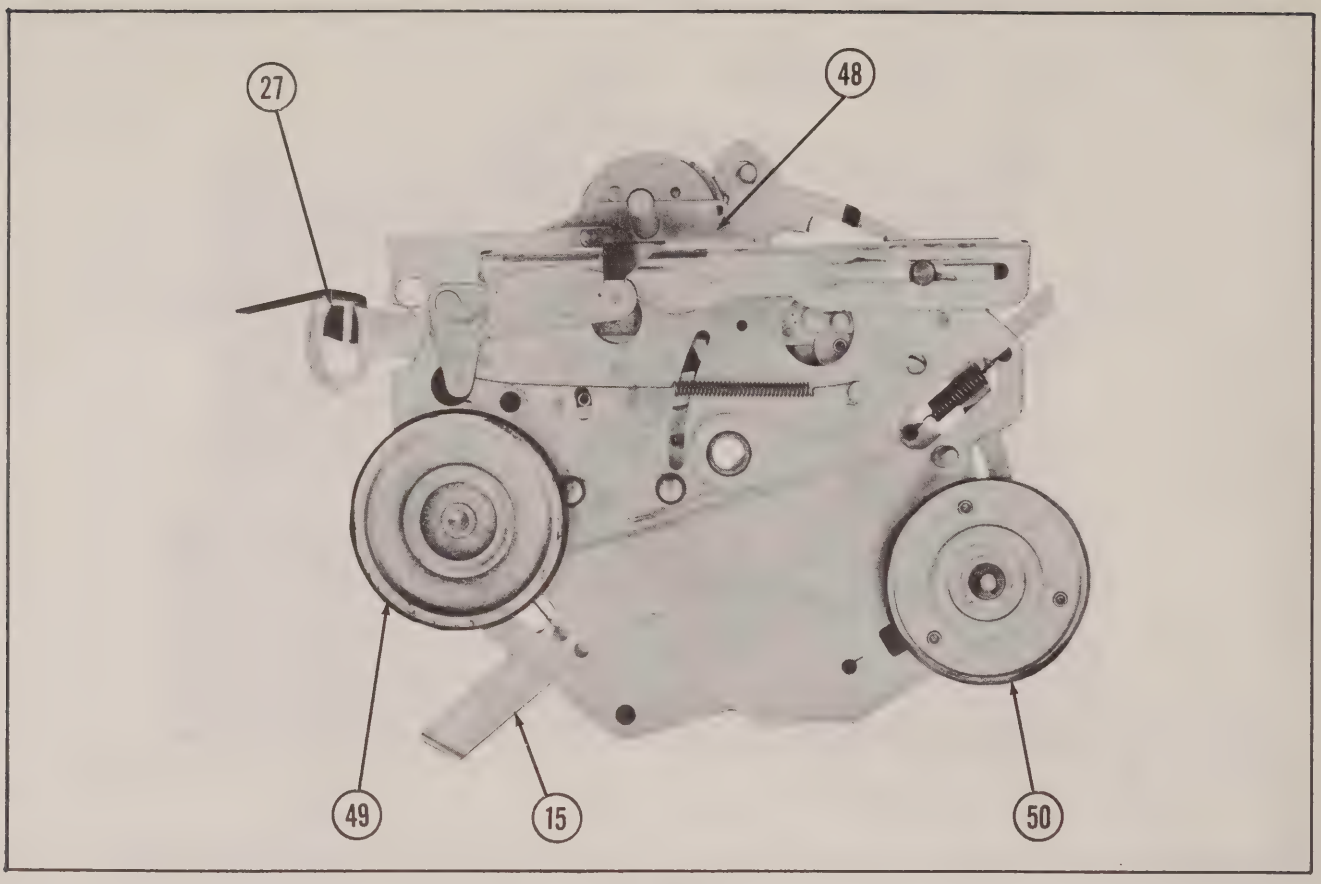

Figure 8

2. Pressure pad worn or missing. Replace pressure pad.

3. Check for dirt on erase head element. Clean with alcohol and a soft cloth.

4. Erase section of head may be open or shorted.

Fails To Record-

1. Pressure pad spring (39) weak or broken resulting in the pressure pad not holding tape firmly against the record head element. Replace spring (39).

2. Pressure pad worn or missing. Replace.

3. Check for dirt on record head element. Clean with alcohol and a soft cloth.

4. Check the recording tape to see if the dull magnetic side is facing the head. If the dull side is facing outward a recording cannot be made.

5. Record section of head may be open or shorted.

No Drive In Record Or Playback-

1. Pressure roller spring (14) disconnected or broken resulting in pressure roller (20) not being held in contact with the capstan. Replace spring.

2. Motor pulley (65) loose on motor shaft.

3. Check idler springs (34 & 62) to make sure that they hold the 3 3/4 ips. idler wheel (60) or the 7 1/2 ips. idler wheel (49) in firm contact with the motor pulley (65) and flywheel (59). When the recorder is in the 3 3/4 ips. speed position idler wheel (60) should make contact, and when in the 7 1/2 ips. position, idler wheel (49) should make contact.

4. Check for oil or grease on motor pulley (65), idler wheels (49/60) and flywheel (59). Clean with alcohol.

5. Take-up drive belt (56) stretched or not properly connected.

6. Check for oil or grease on take-up drive belt (56). Clean with alcohol.

No Drive In Fast Forward-

1. Idler tension spring (35) disconnected or broken, thereby, not holding high speed idler wheel (50) in engagement with flywheel (59) and high speed forward cup (13).

2. Motor pulley (65) loose on motor shaft.

3. Check for oil or grease on motor pulley (65), motor pulleys (49/60), flywheel (59), and idler wheel (50). Clean with alcohol.

No Drive In Rewind-

1. Rewind arm spring (52) disconnected or broken, resulting in rewind cup tire (1A) not contacting motor pulley, (65).

2. Motor pulley (65) loose on motor shaft.

3. Grease or oil on rewind cup tire (1A). Clean with alcohol.

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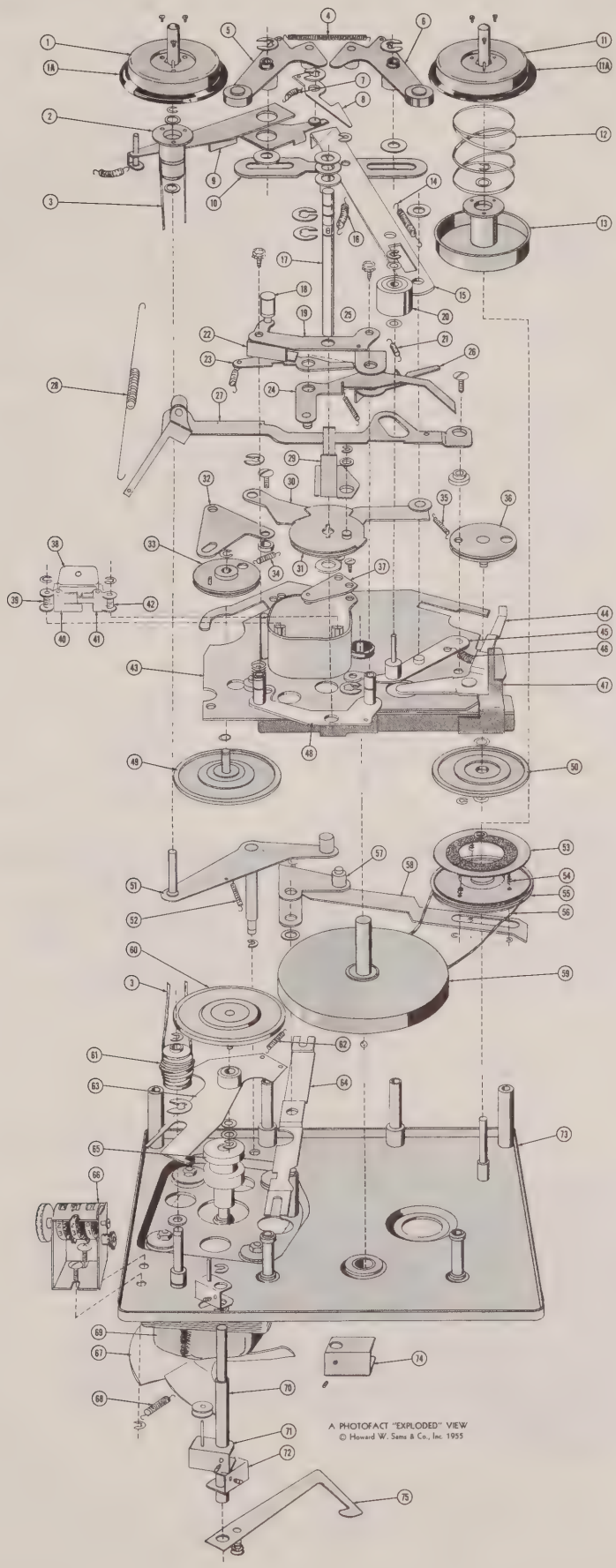


Exploded View of Tape Transport Mechanism.

Tape Overruns Or Spills When Shifting To Neutral From Rewind Or Fast Forward-

1. Brake arm spring (4) disconnected or broken resulting in the brake rollers not contacting the spindle tires when the mechanism is placed in neutral.

Speed Variation Or "Wow"-

Check for binding in the following:

1. Flywheel (59) bearings: Check by holding away idler wheels and rotating the capstan by hand. A small drag is obtained from take-up drive belt (56).

2. Pressure roller (20) bearings.

3. Idler wheels (49/60).

4. Rewind spindle (1) and take-up spindle (11). Brakes should be disengaged before turning spindles.

5. Motor bearing. Turn shaft by hand.

NOTE: Oil or grease on any of the drive surfaces will cause "Wow".

Function Knob Cannot Be Turned To "Play" Position-

1. Spring (25) disconnected or broken. This spring must be connected as shown in Figure 2. If not, the Function Knob cannot be placed in the "Play" position.

Function Knob Will Not Stay In "Play" Or "Record" Position-

1. Spring (21) disconnected or broken. This spring must be connected as shown in Figure 2. If not, the Function Knob will return to "Stop" when placed in the "Play" or "Record" position.

CLEANING

The play-record-erase head (38), pressure roller (20), and the capstan are subject to an accumulation of tape coating oxide which is worn off the tape as it passes these parts. This accumulation should be periodically removed since it may cause poor erase, faint recordings and poor playback. Wipe off the above surfaces carefully with a clean soft cloth. If oxide is caked or hard and will not come off with a dry cloth, dampen the cloth slightly with alcohol.

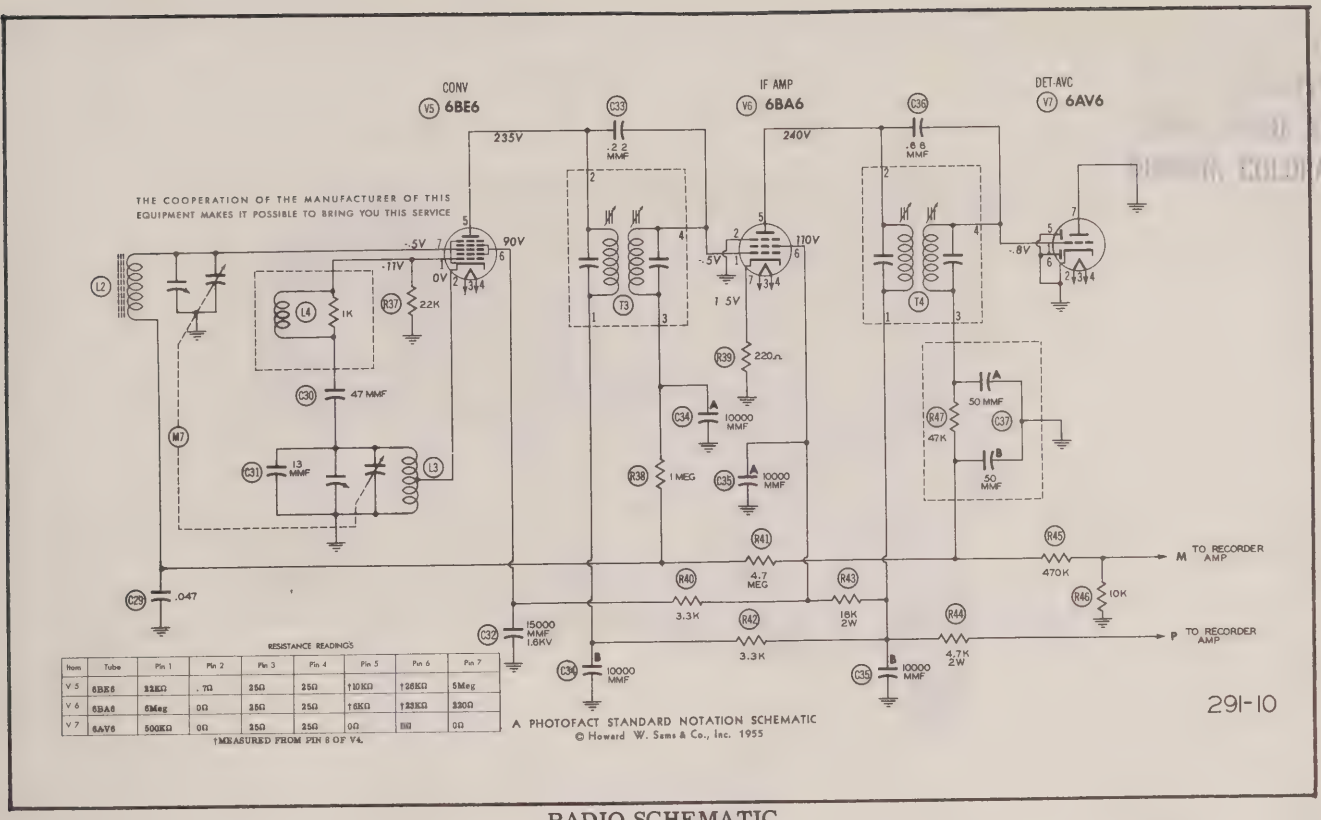
LUBRICATION

In normal use, the Revere requires no lubrication. The motor, flywheel shaft and spindles operate in oilite bearings. When unit is disassembled for repair, clean all bearings and lubricate with light oil. If cam and lever actions become sluggish and slow to respond, it may be due to gum or dirt in the pivots and under the levers. Clean off all old lubricant, accumulated dirt and gum with a clean cloth and cleaning solvent. Apply lubricant in thin film on working surfaces only. Do not over-lubricate.

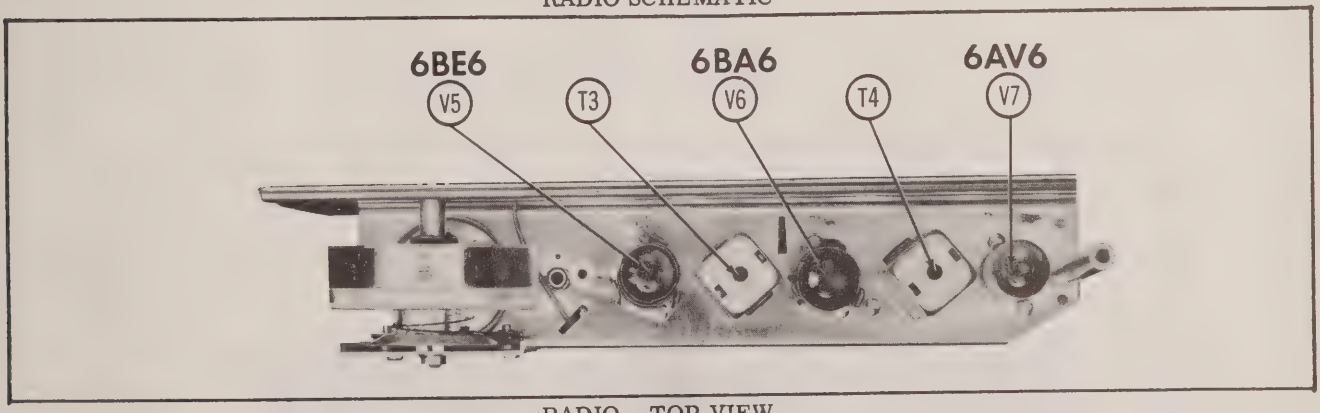
Lubricants To Use-

Oilite bearings--------Light Machine or Spindle Oil.

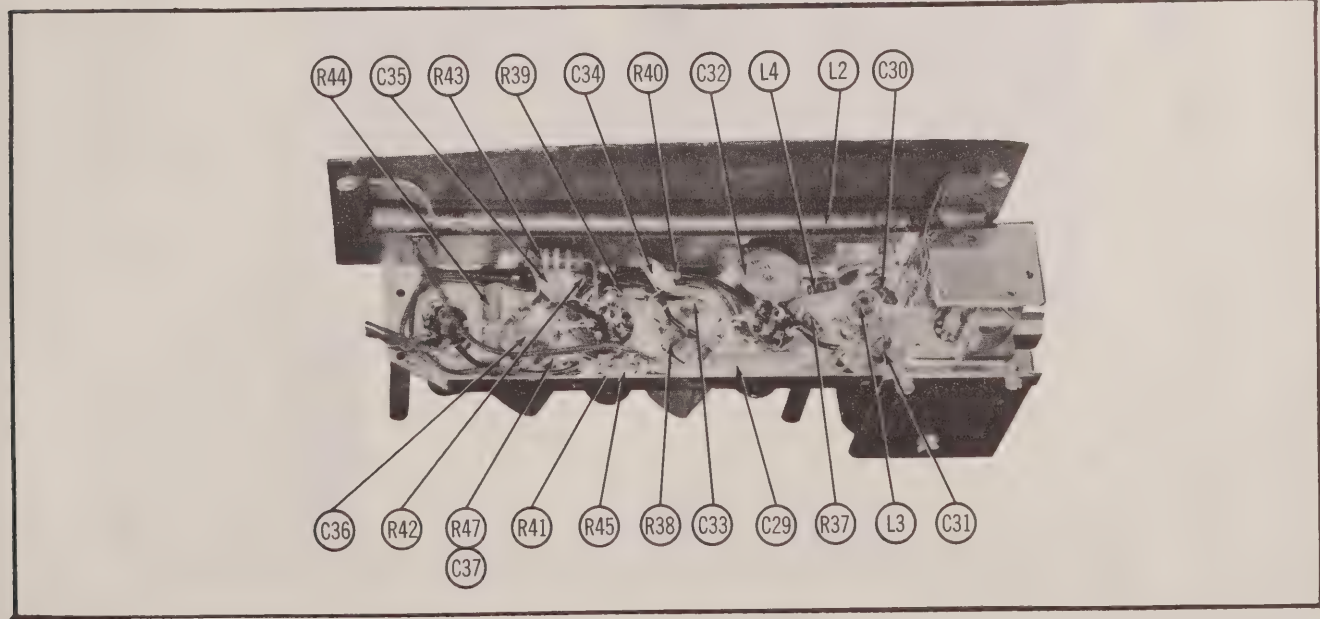
Moving Parts--------Wadharns BRB#1 or Lubriplate.



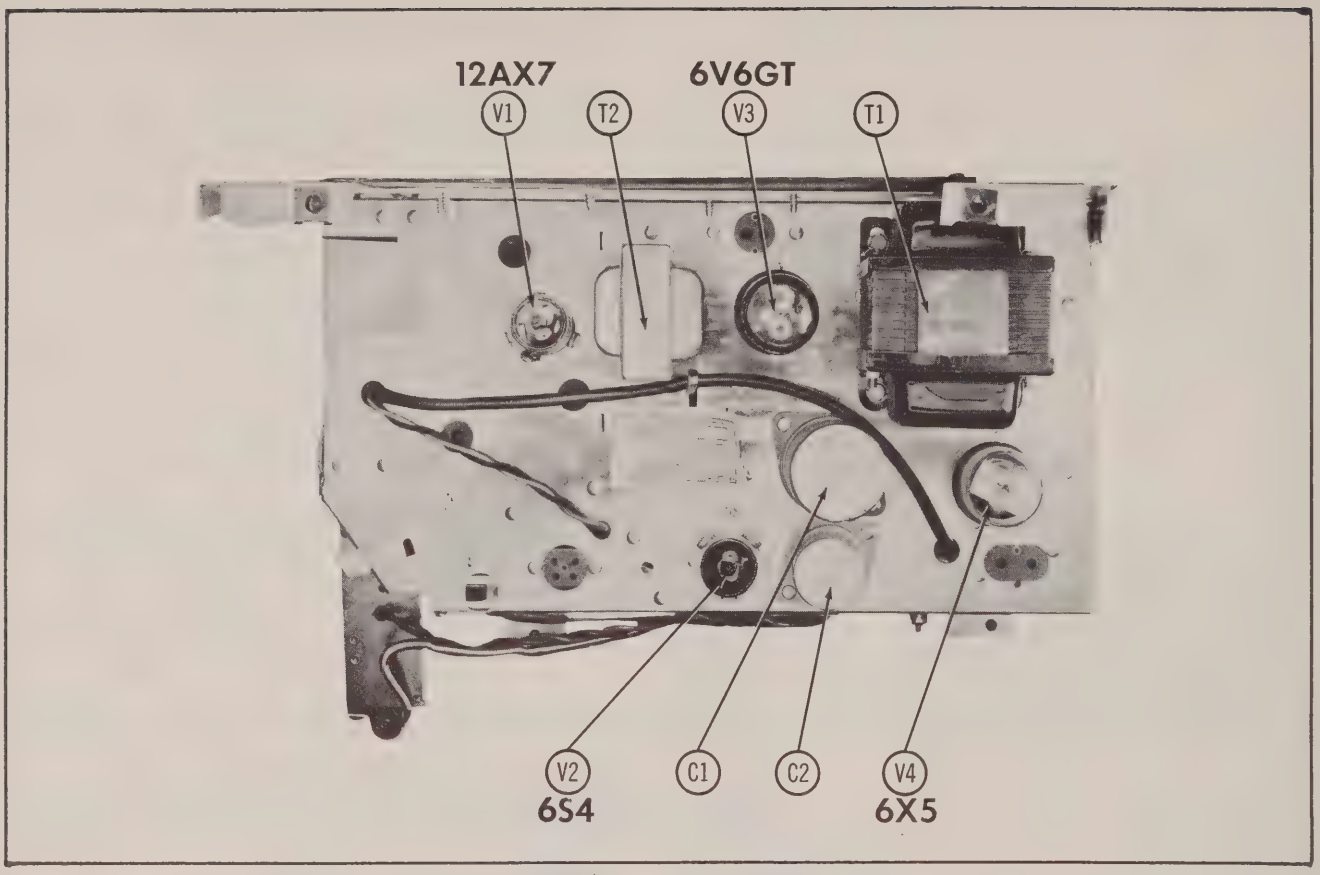
RADIO SCHEMATIC



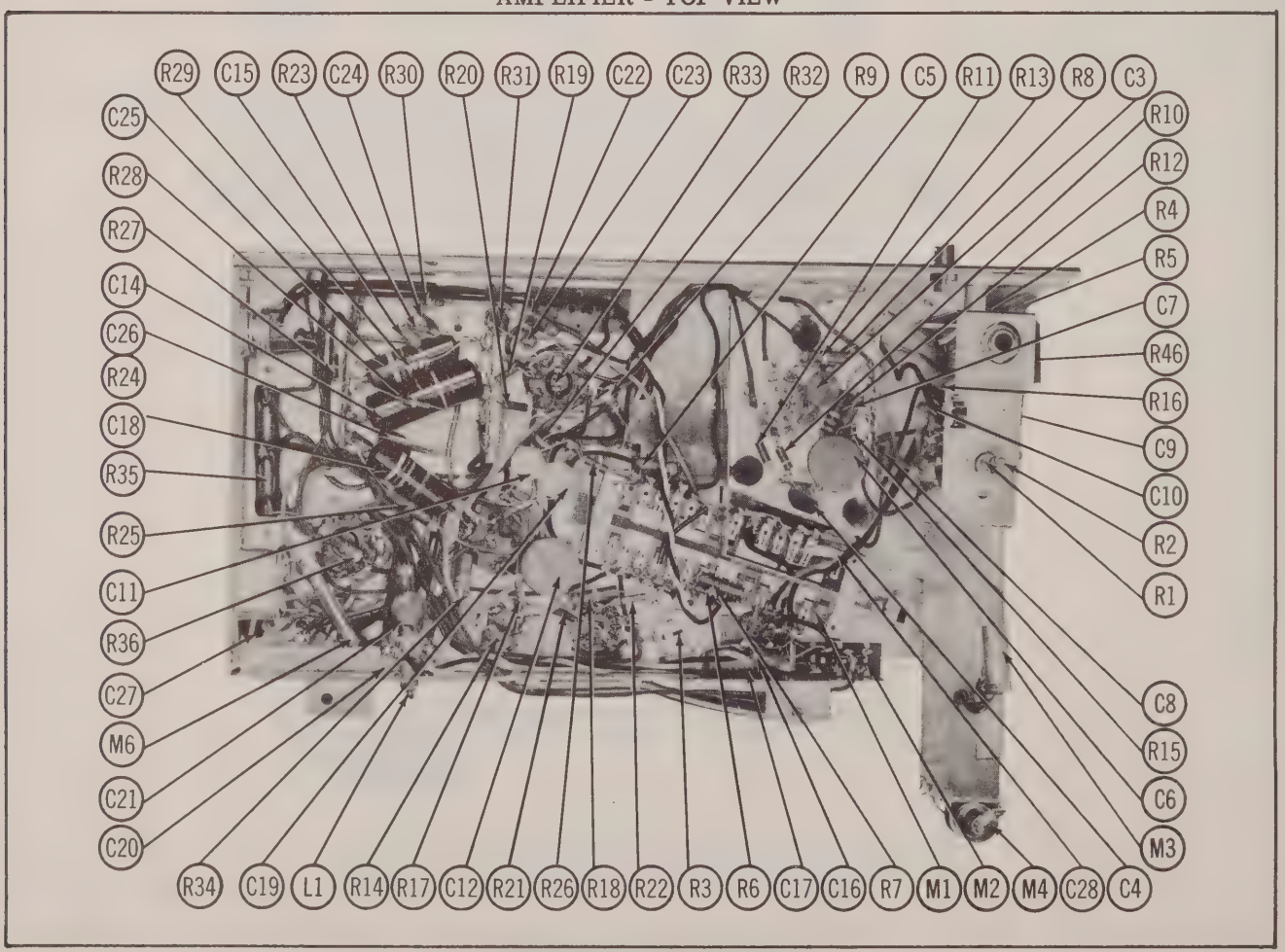
RADIO - TOP VIEW



RADIO - BOTTOM VIEW



AMPLIFIER - TOP VIEW



AMPLIFIER - BOTTOM VIEW

REVERE MODELS TR-1000, TR-1200, TRS-1005, TRS-1025, TRS-1026, TRS-1205, TRS-1225, TRS-1226, TS-905, TS-925, TS-926, TS-1105, TS-1125, TS-1126, TS-1405, TS-1425, TS-1426, T-900, T-1100

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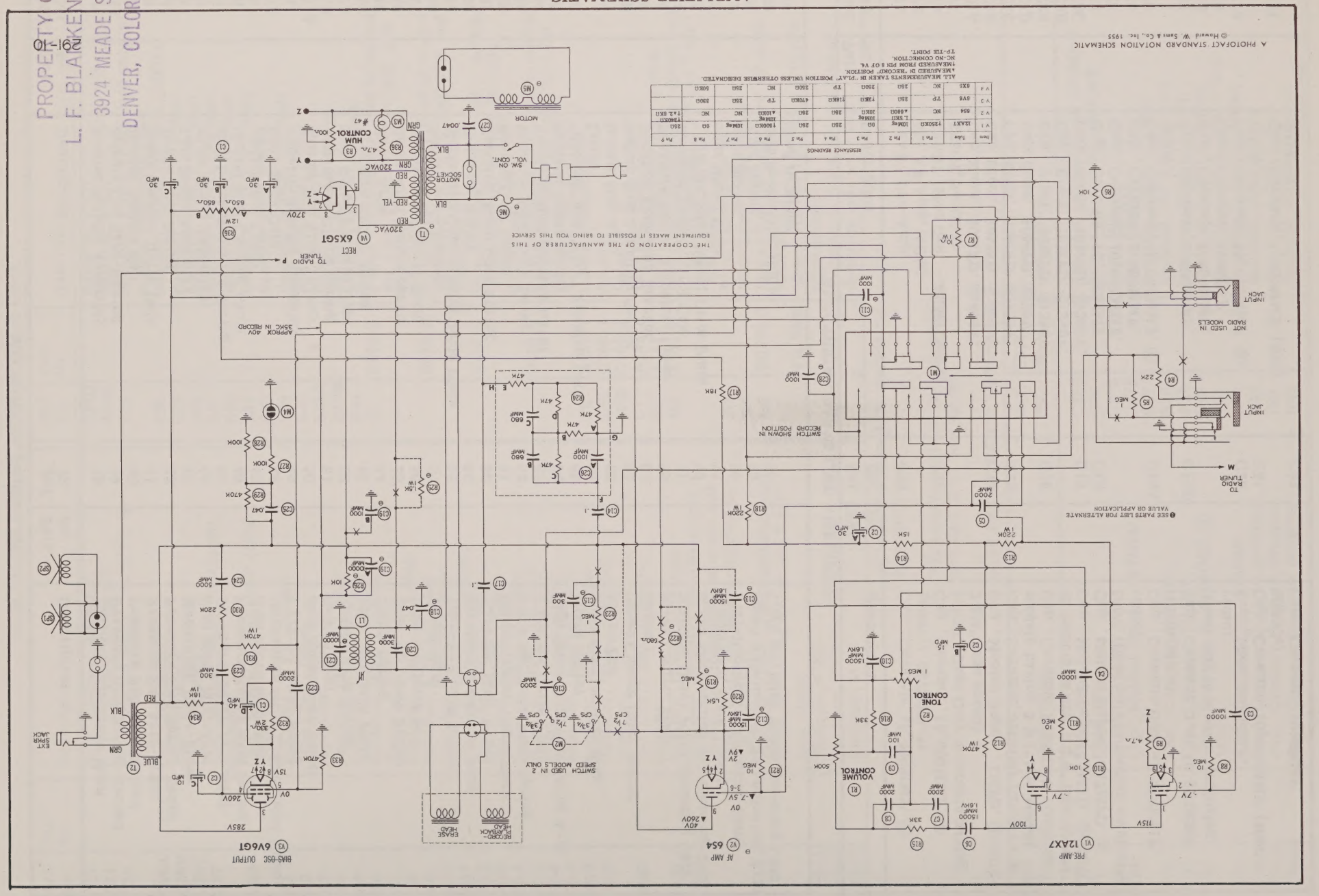
AMPLIFIER SCHEMATIC



MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Rewind Spindle Assembly	38		Play-Record-Erase Head
1A		Spindle Cup Tire-Rewind	39		Pressure Arm Spring-Record
2		Rewind Spindle Hub	40		Pressure Pad Arm-Record
3		Index Counter Drive Belt	41		Pressure Pad Arm-Erase
4		Brake Arm Spring	42		Pressure Arm Spring-Erase
5		Left Brake Assembly	43		Mechanism Plate-Upper
6		Right Brake Assembly	44		High Speed Idler Arm
7		Stop Latch Actuating Spring	45		Pressure Roller Arm Assy.
8		Instant Stop Locking Latch	46		Pressure Roller Arm Spring
9		Instant Stop Lever	47		High Speed Slide Assy.
10		Rear Slide Cam	48		Mechanism Shaft Lower Guide Plate
11		Take-Up Spindle Assembly	49		7 1/2 ips. Idler Wheel
11A		Spindle Cup Tire-Takeup	50		High Speed Idler Wheel
12		High Speed Clutch Spring	51		Rewind Arm
13		High Speed Forward Cup	52		Rewind Arm Spring
14		Pressure Roller Spring	53		Take-up Clutch Plate
15		Brake Arm	54		Clutch Spring
16		Brake Arm Return Spring	55		Take-Up Drive Pulley
17		Mechanism Control Shaft	56		Take-Up Drive Belt
18		Record Lock Button	57		Toggle Arm
19		Mechanism Control Shaft Guide Plate	58		Take-Up Clutch Lever
20		Pressure Roller	59		Flywheel & Capstan Assy.
21		Function Knob Lock Spring	60		3 3/4 ips. Idler Wheel
22		Record Lock Lever	61		Index Counter Worm Gear
23		Function Knob Lock Lever	62		3 3/4 ips. Drive Plate Spring
24		Function Knob Release Lever	63		3 3/4 ips. Drive Plate
25		Release Lever Spring	64		High Speed Slide Connecting Arm
26		"Record" and "Play" Position Lock Lever	65		Motor Pulley
			66		Index Counter Assembly
27		Instant Stop Arm	67		Motor Fan
28		Instant Stop Actuating Spring	68		Speed Change Index Spring
29		Function Knob Stop Bracket	69		Motor
30		Pressure Roller Actuating Lever	70		Speed Control Shaft
31		Function Knob Control Cam	71		3 3/4ips. Drive Plate Actuating Cam
32		7 1/2 ips. Idler Wheel Pivot Plate	72		Speed Equalization Sw. Actuating Cam
33		Idler Wheel Slide	73		Mechanism Plate-Lower
34		Idler Spring	74		Play-Record Sw. Actuating Cam
35		Idler Spring	75		Speed Equalization Sw. Actuating Arm
36		High Speed Idler Slide	76		7 1/2 ips. Idler Wheel Actuating Cam
37		Head Retainer			

ELECTRICAL PARTS LIST- AMPLIFIER

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1		12AX7, Pre-Amp.	C12		Cap., Ceramic, 15, 000MMF. ⓐ 1600V. (. 047MFD. *)
V2		6S4, AF Amp. (6C4♦)			
V3		6V6GT, Bias Osc. - Audio Output	C13		Cap., Ceramic, 15, 000MMF. ⓐ 1600V. (Used Only in models having 3 3/4" tape speed)
V4		6X5GT, Rectifier			
C1A		Cap. Elect., 30MFD. ⓐ450V.			
C1B		Cap. Elect., 30MFD. ⓐ400V.	C14		Cap., Molded Paper, . 1MFD. ⓐ500V.
C1C		Cap. Elect., 30MFD. ⓐ350V.	C15		Cap., Ceramic, 300MMF.(Omitted in models having 3 3/4" tape speed)
C1D		Cap. Elect., 40MFD. ⓐ25V.			
C2A		Cap., Elect., 30MFD. ⓐ350V.	C16		Cap., Ceramic, 2000MMF. (Omitted in models having 3 3/4" tape speed)
C2B		Cap., Elect., 15MFD. ⓐ350V.			
C2C		Cap., Elect., 10MFD. ⓐ300V.	C17		Cap., Molded Paper, . 1MFD. ⓐ200V.
C3		Cap., Ceramic, 10, 000MMF.	C18		Cap., Molded Paper, . 047MFD. ⓐ 500V. (Used only in models employing radio)
C4		Cap., Ceramic, 10, 000MMF.			
C5		Cap., Ceramic, 2, 000MMF.			
C6		Cap., Ceramic, 15, 000MMF. ⓐ 1600V.	C19A		Cap., Ceramic Dual, 10, 000MMF. (1000MMF.♦)
C7		Cap., Ceramic, 2, 000MMF.	C19B		Cap., Ceramic Dual, 10, 000MMF. (Used only in models employing radio)
C8		Cap., Ceramic, 2, 000MMF.			
C9		Cap., Ceramic, 100MMF.			
C10		Cap., Ceramic, 15, 000MMF. ⓐ 1600V.	C20		Cap., Mica, 3000MMF.
			C21		Cap., Ceramic, 10, 000MMF. (2000 MMF.♦)
C11		Cap., Ceramic, 1, 000MMF. (2000 MMF. *)			
			C22		Cap., Ceramic, 2000MMF.

OF
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ELECTRICAL PARTS LIST(AMPLIFIER) Con't.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C23		Cap., Ceramic, 300MMF.	R24D		Resistor, 47KΩ
C24		Cap., Ceramic, 5000MMF.	R24E		Resistor, 47KΩ
C25		Cap., Molded Paper, .047MFD. ⓐ 500V.	R25		Resistor, 1.5KΩ, 1Watt(Used only in models employing radio)
C26A		Cap., 1000MMF.	R26		Resistor, 10KΩ, 1/2 Watt (22KΩ♦)
C26B		Cap., 680MMF.	R27		Resistor, 100KΩ, 1/2 Watt
C26C		Cap., 680MMF.	R28		Resistor, 100KΩ, 1/2 Watt
C27		Cap., Molded Paper, .0047MFD. ⓐ1000V.	R29		Resistor, 470KΩ, 1/2 Watt
			R30		Resistor, 220KΩ, 1/2 Watt
C28		Cap., Ceramic, 1000MMF. (3000 MMF. *)	R31		Resistor, 470KΩ, 1/2 Watt
			R32		Resistor, 330Ω, 2 Watt
R1		Vol. Cont. & Sw., 500KΩ	R33		Resistor, 470KΩ, 1/2 Watt
R2		Tone Cont., 1Meg.	R34		Resistor, 18KΩ, 1 Watt
R3		Hum Cont., 100Ω	R35A		Resistor, 650Ω } 12 Watt
R4		Resistor, 22KΩ, 1/2 Watt	R35B		Resistor, 650Ω }
R5		Resistor, 1Meg., 1/2 Watt	R36		Resistor, 4.7Ω, 1/2 Watt
R6		Resistor, 10KΩ, 1/2 Watt	T1	B130-3	Power Transformer(Used in models TR-1000, TRS-1005, TR-1200, and TRS-1205)
R7		Resistor, 10Ω, 1 Watt			
R8		Resistor, 10Meg., 1/2 Watt			
R9		Resistor, 4.7Ω, 1/2 Watt		B130-4	Power Transformer(Used in models TRS-1025, TRS-1026, TRS-1225 and TRS-1226)
R10		Resistor, 10KΩ, 1/2 Watt			
R11		Resistor, 10Meg., 1/2 Watt			
R12		Resistor, 470KΩ, 1 Watt		B130-1	Power Transformer(Used in models T-900, TS-905, T-1100, TS-1105, T-1400 and TS-1405)
R13		Resistor, 220KΩ, 1 Watt			
R14		Resistor, 15KΩ, 1/2 Watt			
R15		Resistor, 33KΩ, 1/2 Watt		B130-2	Power Transformer(Used in models TS-925, TS-926, TS-1125, TS-1126, TS-1425 and TS-1426)
R16		Resistor, 33KΩ, 1/2 Watt			
R17		Resistor, 18KΩ, 1/2 Watt			
R18		Resistor, 220K, 1/2 Watt	T2	A131-1	Output Transformer
R19		Resistor, 1Meg., 1/2 Watt (120KΩ*)	SP1	C160-1	Speaker
			SP2	C160-2	Speaker
R20		Resistor, 1.5KΩ, 1/2 Watt (470Ω*)	L1	A132-8	Bias Osc. Coil(A132-1 ♦)
			M1	A141-1	Record-Stop-Play Slide Switch
R21		Resistor, 10Meg., 1/2 Watt	M2	A141-8	Speed Equalization Switch(Used only in models having 3 3/4" and 7 1/2" tape speeds)
R22		Resistor, 680Ω, 1/2 Watt(Used only in models employing radio and both tape speeds. Omitted or shorted in other models)			
			M3		Pilot Lamp, Type #47
			M4		Neon Lamp, Type #NE45
R23		Resistor, 1Meg., 1/2 Watt(Used only in models having 3 3/4" and 7 1/2" tape speed)	M5	TR-7801	Motor(For 120 volt, 50 or 60 cycle application)
				TR-7802	Motor(For 230 volt, 50 or 60 cycle application)
R24A		Resistor, 47KΩ			
R24B		Resistor, 47KΩ	M6		Fuse(When replacing use fuse of duplicate type and value)
R24C		Resistor, 47KΩ			

♦Alternate part used in models not employing radio.

*Alternate part used only in models having 3 3/4" tape speed.

ELECTRICAL PARTS LIST-RADIO

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V5		6BE6, Conv.	C35B		Cap., Ceramic Dual, 10, 000MMF.
V6		6BA6, IF Amp.	C36		Cap., Composition, .68MMF.
V7		6AV6, Det-AVC	C37A		Cap., 50MMF.
C29		Cap., Molded Paper .047MFD. ⓐ200V.	C37B		Cap., 50MMF.
			R37		Resistor, 22KΩ, 1/2 Watt
C30		Cap., Ceramic, 47MMF.	R38		Resistor, 1Meg., 1/2 Watt
C31		Cap., Ceramic, 13MMF.	R39		Resistor, 220Ω, 1/2 Watt
C32		Cap., Ceramic, 15, 000MMF. ⓐ 1600V.	R40		Resistor, 3.3KΩ, 1/2 Watt
			R41		Resistor, 4.7Meg. ⓐ1/2 Watt
C33		Cap., Composition, .22MMF.	R42		Resistor, 3.3KΩ, 1/2 Watt
C34A		Cap., Ceramic Dual, 10, 000MMF.	R43		Resistor, 18KΩ, 2 Watt
C34B		Cap., Ceramic Dual, 10, 000MMF.	R44		Resistor, 4.7KΩ, 2 Watt
C35A		Cap., Ceramic Dual, 10, 000MMF.	R45		Resistor, 470KΩ, 1/2 Watt

ELECTRICAL PARTS LIST(RADIO) Con't.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R46		Resistor, 10KΩ, 1/2 Watt	L2	C133-3	Ferrite Antenna
R47		Resistor, 47KΩ	L3	A132-9	AM Osc. Coil
T3	A132-4	IF Transformer, Input	L4		RF Choke(Wound on 1KΩ Resistor)
T4	A132-5	IF Transformer, Output	M7	A142-1	Tuning Capacitor, 2 Gang

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